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# EDINBURGH MEDICAL AND SURGICAL JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

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# EDINBURGH
# MEDICAL AND SURGICAL JOURNAL.

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The Nature and Treatment of Cancer. By Walter Hayle Walshe, M. D., Professor of Pathological Anatomy in University College, Physician to University College Hospital, and to the Hospital for Consumption and Diseases of the Chest. London, 1846. 8vo. Pp. 590.

Lectures on the Nature and Treatment of Deformities; delivered at the Royal Orthopædic Hospital, Bloomsbury Square. By R. W. Tamplin, F. R. C. S. E., Surgeon to the Hospital 12mo. Pp. 267. London, 1846.

Sixth Clinical Report of the Crichton Royal Institution for the Treatment of Lunatics, Dumfries, 11th November 1846. 8vo. Pp. 36.

A System of Surgery. By J. M. Chelius, Doctor in Medicine and Surgery, &c., &c. Translated from the German, and accompanied with additional Notes and Observations. By John F. South, Professor of Surgery to the Royal College of Surgeons of England, and Surgeon to St Thomas's Hospital. London, 1846. Part ix. 8vo. Pp. 96. Part x. P. 96–192. 1846.

London Sewage Company. Report upon the proposed works by Thomas Wicksteed, Esq., Engineer to the Company. 8vo. Pp. 55. London, 1845.

Confessions of a Homœopathist. Dublin, London, Edinburgh, 1846. 12mo. Pp. 399.

Physical Education and the preservation of Health. By John C. Warren, M. D., Professor of Anatomy and Surgery in Harvard University. Boston, 1846. 12mo. Pp. 90.

Report of the Practice of University College Hospital. London. By Dr Murphy. 8vo. Pp. 53.

A System of Practical Surgery. By William Fergusson, F. R. S. E. Professor of Surgery in King's College, London. Second Edition. With Illustrations by Bagg. Post 8vo. Pp. 668.

A Manual of Medical Jurisprudence. By Alfred S. Taylor, F. R. S. Lecturer on Medical Jurisprudence and Chemistry in Guy's Hospital. Second Edition. London, 1846. Post 8vo. Pp. 704.

The Practice of Surgery. By James Miller, F. R. S. E., F. R. C. S. E., Professor of Surgery in the University of Edinburgh. Edinburgh, 1846. Post 8vo. Pp. 688.

Lectures Illustrative of Various Subjects in Pathology and Surgery. By Sir Benjamin C. Brodie, Bart., F. R. S., Sergeant-Surgeon to the Queen, &c. London, 1846. 8vo. Pp. 411.

The Medico-Chirurgical Review and Journal of Practical Medicine. New Series. No. v. 87 of old. January, 1846. London, 1846. 8vo.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D., F.R.S., &c. No. xli. January 1846. London, 8vo.

The London Medical Gazette, Session 1845—1846. New Series. No. 34, Friday, 19th December 1845, to No. 46, Friday, 13th March 1846.

Weekly Tables of Mortality for the Metropolis, No. 50, Saturday, 13th December 1846, to No. 11, Saturday, 14th March 1846. 14th January not received.

The Provincial Medical and Surgical Journal. Edited by Robert J. N. Streeten, M. D. No. 40.

The Northern Journal of Medicine. Edited by William Seller, M.D., F. R. C. Physician, &c. No. xxi. January 1846; No. xxii., No. xxiii· March 1846.

The Retrospect of Practical Medicine and Surgery. Being a Half-yearly Journal, containing a Retrospective View of every Discovery and Practical Improvement in the Medical Sciences. Edited by W. Braithwaite, Surgeon to the Leeds Eye and Ear Infirmary, &c. &c. Vol XII. July—December 1845. London, 1846. 12mo. Pp. 414.

The Half-yearly Abstract of the Medical Sciences. Being a Practical and Analytical Digest of the Contents of the Principal British and Continental Medical Works published in the preceding six months, together with a series of Critical Reports on the Progress of Medicine and the Collateral Sciences during the same Period. Edited by W. H. Ranking, M. D. Cantab., Physician to the Suffolk General Hospital. Vol. II. July—December 1845. London, 1846. Post 8vo. Pp. 472.

Pharmaceutical Journal and Transactions. Edited by Jacob Bell. Vol. V. No. VII. Lond., January 1, 1846. 8vo.

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## ERRATA.

Page 126, line 8, *for* auscultation *read* circulation.

The Plate to be inserted at page 67 should be marked Plate I., and the Vol. should be LXV.

THE

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# MEDICAL AND SURGICAL JOURNAL.

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A System of Surgery, by J. M. Chelius. Translated from the German by John F. South, Surgeon to St Thomas's Hospital, and accompanied with additional notes and observations. Part vii. and Part viii. concluding the first volume. London, 1845. 8vo. Pp. 814.

A Clinical Introduction to the Practice of Auscultation, and other modes of Physical Diagnosis. Intended to simplify the study of the diseases of the Lungs and Heart. By H. M. Hughes, M. D., Fellow of the Royal College of Physicians, Assistant Physician to Guy's Hospital, &c. London, 1845. 12mo, pp. 246.

The Modern Treatment of Syphilitic Diseases, both primary and secondary, comprising numerous Formulæ for the preparation and mode of administration of the New Remedies; and an Account of a safe and successful Mode of treating Chronic, Protracted, and Constitutional Syphilis, by the Mercurial Vapour Bath. By Langston Parker, Surgeon to the Queen's Hospital, Birmingham, &c., &c. Second Edition, London, 1845. Post 8vo, pp. 228.

Urologiè, Traité des Angusties ou Retrecissements de l'Urètre, leur traitement rationel. Par le Docteur Leroy D'Etiolles, Membre des Académie de Bruxelles, de Madrid, de St Petersbourg, de la Societé Imperiale des Medecines de Vienne, de la Societé Royal d'Edimbourg, &c., &c. Avec 107 Figures intercalées dans le Texte, et 5 Pl. Lithographiées. A Paris, J. B. Bailliere, Libraire. Londres, H. Baillière, Lyon, Bruxelles, 1845. 8vo, pp. 488.

On Scarlatina and its Successful Treatment by the *Acidum Aceticum Dilutum* of the Pharmacopœia. By Isaac B. Brown. London, 1846. Post 8vo, pp. 66.

The Descriptive and Physiological Anatomy of the Brain, Spinal Chord, and Ganglions, and of their Coverings. Adapted for the use of Students. By Robert Bently Todd, M. D., F. R. S., Fellow of the Royal College of Physicians, Physician to King's College Hospital, and Professor of Physiology in King's College, London. London, 1845. Post 8vo. pp. 284.

Lectures on Natural and Difficult Parturition. By Edward William Murphy, N. M., M. D., Professor of Midwifery, University College, London; Obstetric Physician, University College Hospital, &c. London, 1845. 8vo, pp. 267.

Prize Clinical Reports of Surgical Cases treated at the Queen's Hospital, Birmingham, in the Practice of William Sands Cox, F. R. S., Senior Surgeon. By John Moore, Student of Queen's College, and Resident Medical Officer of the Queen's Hospital, Birmingham. London, 1845. 8vo, pp. 65.

Report of the Medical Officers of the Lunatic Asylum for the County of Lancaster. Instituted 28th July 1816. 1841. Lancaster. 8vo. pp. 33.

Report of the Medical Officers of the Lunatic Asylum for the County of Lancaster. Instituted 28th July 1816. 1845. Lancaster. 8vo, pp. 37.

On the Digestion of Vegetable Albumen, Fat, and Starch. By Robert D. Thomson, M. D., Lecturer on Practical Chemistry in the University of Glasgow, London, 1854. 8vo, pp. 14.

On the Proportion of Nitrogen contained in Alimentary Substances taken from both the Organic Kingdoms, as a Comparative Measure of their Nutritive Power. By Dr J. Schlossberger and Alexander Kemp, Assistant

Chemical Teachers in the University of Edinburgh. 8vo, pp. 12. (Both from the London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science.)

An Inaugural Address delivered at the opening of the Norfolk and Norwich Hospital Museum, September 10, 1845. By John Greene Crosse, M.D., F.R.S., and Senior Surgeon to the Hospital. Norwich, 1845. 8vo, pp. 28.

Transactions of the Medical and Physical Society of Bombay for the year 1843. Large 8vo. Pp. 240.

Observations on the Nosological Arrangement of the Bengal Medical Returns, with a few Cursory Remarks on Medical Topography and Military Hygiene. By Frederic J. Mouat, M.D., F.R.C.E., Assistant Surgeon Bengal Army, Professor of Materia Medica and Medical Jurisprudence in the Bengal Medical College, &c. &c. Calcutta, 1845. 8vo. Pp. 64.

An Address by the Society of Apothecaries, to the General Practitioners of England and Wales, on the Second Report of the Joint Deputation of the Society of Apothecaries, and the National Association of General Practitioners. London, 1845. 8vo. Pp. 29.

Mesmeric Experiences. By Spencer T. Hall, author of the Forester's Offering, &c. &c. London, 1845. 12mo. Pp. 103.

Illustrations of Modern Mesmerism, from Personal Investigation. By John Forbes, M.D., F.R.S., &c. London, 1845. 12mo. Pp. 101.

A Memoir on Amputation of the Thigh at the Hip-joint, with a successful case. By William Sands Cox, F.R.S., Fellow of the Royal College of Surgeons of England, Professor of Anatomy and Surgery, and Dean of the Faculty of Queen's College, Birmingham; Senior Surgeon of Queen's College Hospital, &c. &c. &c. London and Paris, 1845. Folio. Pp. 45. Two coloured drawings and several Woodcuts.

The Medico-Chirurgical Review and Journal of Practical Medicine. New Series. No. IV. 86 of old. October 1845. London. 8vo.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M.D., F.R.S., F.G.S., &c. No. XL. October 1845. London.

The London Medical Gazette. Session 1844. London, 1845. New Series. No. 21, 19th September 1845, to No. 33, Friday, 12th December 1845.

Weekly Tables of Mortality for the Metropolis. No. 37, Saturday, 13th September 1845, to No. 49, Saturday, 6th December 1845.

The Northern Journal of Medicine. A Monthly Survey of the Progress of Medical Knowledge at Home and Abroad. Edited by William Seller, M.D., &c. No. 19. November 1845. No. 20. December. Edinburgh, 1845.

The British American Journal of Medical and Physical Science. Edited by Archibald Hall, M.D., and Robert L. Macdonell, M.D. October 1845. No. 7. November 1845. No. 8. 4to.

The American Journal of the Medical Sciences. Edited by Isaac Hays, M.D., &c. No. 20. New Series. October 1845. Philadelphia, London, Paris.

The New York Journal of Medicine and the Collateral Sciences. Edited by Charles A. Lee. M.D., Professor of General Pathology and Materia Medica in Geneva Medical College, &c. September 1845. Vol. v. No. 14.

The Medical Examiner and Record of Medical Science. Edited by Robert M. Huston, M.D., &c. No. 9. September 1845 to No. 10. New Series. October 1845.

Provincial Medical and Surgical Journal. Edited by Robert J. N. Streeten, M.D. No. 39, Wednesday, 24th September.

THE

# EDINBURGH MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1846.

## PART I.

## ORIGINAL COMMUNICATIONS.

### Art. I.—*Report of Cases treated in the Royal Naval Hospital, Malta, in* 1843 *and* 1844. Reported by Thomas Spenser Wells, F. R. C. S., Assistant-Surgeon to the Hospital.

The following table gives the number of cases treated during the years 1843 and 1844 in Malta Hospital:—

| | 1843. | 1844. |
|---|---|---|
| Remaining in hospital January 1, | 59 | 37 |
| Received during the year, | 394 | 291 |
| | 453 | 328 |

Of these cases, there have been in

| | 1843. | 1844. |
|---|---|---|
| Cured, | 323 | 231 |
| Invalided, | 72 | 59 |
| Dead, | 21 | 13 |
| | 416, leaving 37 in hospital on January 1, 1844. | 303, leaving 25 in hospital Jan. 1, 1845. |

In 1843 the largest daily number of cases treated was 107; in 1844 it was 57. The daily average of the year 1843 was 84; of 1844 it was 31. The proportion of deaths and invaliding in 1842 was $7\frac{1}{10}$ per cent. of deaths, and $22\frac{2}{7}$ per cent. invaliding. In 1843 the per centage of deaths was only $5\frac{1}{3}$, of invaliding $18\frac{1}{3}$. In 1844 that of deaths only $4\frac{1}{2}$, of invaliding $20\frac{1}{4}$

The following tables show the causes of deaths and invaliding in 1843 and 1844.

| | 1843. | | 1844. | |
|---|---|---|---|---|
| Phthisis, | 4 | | 1 | |
| Disease of kidneys and liver, | 2 | | 1 | |
| Cardiac disease, | 2 | Fever, | 2 | |
| Pneumonia, | 1 | Purpura, | 1 | |
| Gangrene of lung. | 1 | | 1 | |
| Apoplexy, | 1 | | 1 | |
| Phlebitis, | 1 | | 2, | 1 being from dissection wound. |
| Delirium tremens, | 1 | | 0 | |
| Variola, | 1 | | 1 | |
| Erysipelas, | 1 | | 0 | |
| Softening of brain, | 1 | | 1 | with serous effusion. |
| Dysentery, | 1 | | 0 | |
| Ruptured bladder, | 2 | ruptured urethra, | 1 | |
| Fractured skull, | 1 | fractured sacrum, | 1 | |
| Generally impaired health, without morbid appearance, | 1 | | 0 | |
| | 21 | | 13 | |

The causes of invaliding were as follow.

| | 1843. | | 1844. | |
|---|---|---|---|---|
| Diseases of nervous system, | 6 | | 3 | |
| respiratory organs, | 24 | | 18 | |
| circulatory do. | 2 | | 2 | |
| digestive do. | 11 | | 4 | |
| genito-urinary do. | 4 | | 4 | |
| tegumentary and fibrous system, | 6 | | 6 | |
| organs of locomotion, | 5 | | 4 | |
| Debility arising from various affections, | 4 | | 1 | |
| | | Injuries, | 5 | |
| Specific diseases:<br>Syphilis, 3<br>Intermittent fever, 1<br>Lupus, 1<br>Erysipelas, 1 | 6 | | 3 | viz. Syphilis, 1<br>Variola, 1<br>Erysipelas, 1 |
| | 68 | | 50, | and 9 others invalided in 1843 but discharged in 1844, giving the 59 discharged as invalids in 1844. |
| 4 others included in a former report, making discharged as invalids during the year. | 72 | | | |

It is necessary to observe that, as a general rule, the surgeons of ships who have been on the station during the time embraced by this report, send to hospital only such cases as from their nature or severity cannot be conveniently treated on board. The patients, therefore, must not be regarded as common cases of disease, but the worst cases in a fleet of about 5000 men.

The following tables show the proportion of diseases of the different organs of the body in all the months of the two years, with the state of the barometer and thermometer, the prevailing winds, and the number of rainy days.

| 1843. | Diseases of | | | | | | | | | | Thermometer. | | | Barometer. | | | Number of rainy days. | Prevailing winds. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nervous system. | Respiratory organs. | Organs of circulation. | Digestive organs. | Genito-urinary organs. | Organs of locomotion. | Tegument and fibrous systems. | Injuries of all kinds. | Specific diseases. | Total. | Maximum. | Medium. | Minimum. | Maximum. | Medium. | Minimum. | | |
| January, | 3 | 9 | ... | 3 | 3 | 2 | 13 | 6 | 13 | 52 | 59 | 55½ | 51 | 30.05 | 29.72 | 29.50 | 15 | W.N.W., N.W. |
| February, | 5 | 12 | ... | 2 | 2 | 2 | 7 | 7 | 12 | 49 | 61 | 57½ | 54 | 30.17 | 29.68 | 29.20 | 8 | S.W., S.S.E., W.N.W. |
| March, | 2 | 5 | 1 | 3 | 1 | ... | 4 | 10 | 15 | 41 | 62½ | 58½ | 53 | 30.03 | 29.70 | 29.38 | 8 | W., E.N.E., N.N.E., W.N.W. |
| April, | 2 | 3 | 1 | 1 | 1 | ... | 5 | 5 | 6 | 24 | 72½ | 63 | 60 | 30.03 | 29.76 | 29.50 | 2 | W.N.W., N.W. |
| May, | 1 | 3 | 1 | 2 | ... | 3 | 11 | 10 | 10 | 41 | 71 | 64 | 60 | 30.05 | 29.82 | 29.60 | 4 | E., E.S.E., E.N.E. |
| June, | 2 | 6 | 2 | 2 | 1 | 2 | 5 | 2 | 13 | 35 | 78 | 73 | 70 | 29.96 | 29.80 | 29.70 | ... | E., S E., S.S.E. |
| July, | 3 | 7 | ... | 2 | 3 | 2 | 4 | 9 | 5 | 35 | 81 | 77 | 73 | 30.02 | 29.91 | 29.80 | .. | N. N.W., E.N.E. |
| August, | ... | 5 | 1 | 2 | ... | ... | 2 | 7 | 5 | 22 | 83 | 79 | 75 | 30.04 | 29.94 | 29.84 | 1 | N.W., N.E., S.S.W. |
| September, | 2 | 2 | 1 | 5 | 2 | ... | 6 | 4 | 2 | 24 | 81½ | 76 | 72½ | 30.11 | 29.90 | 29.70 | 4 | E.N.E , N.E., E., S.E. |
| October, | 3 | 3 | ... | 2 | 2 | 1 | 2 | 3 | 8 | 24 | 76 | 73 | 70 | 30.12 | 29.98 | 29.85 | ... | ESE., S.E., W.S.W. |
| November, | ... | ... | ... | 4 | 1 | ... | 3 | 5 | 2 | 15 | 73 | 67 | 59 | 30.10 | 29.80 | 29.50 | 11 | E.S.E. S.E., W.N.W. |
| December, | 2 | 5 | ... | 4 | 2 | 1 | 7 | 4 | 7 | 32 | 62 | 59½ | 56 | 30.33 | 30.12 | 29.94 | 11 | W.N.W., N.E. N.W. |
| Total, | 25 | 60 | 7 | 32 | 18 | 13 | 69 | 72 | 98 | 394 | | | | | | | 64 | |
| 1844. | | | | | | | | | | | | | | | | | | |
| January, | 1 | 3 | ... | 1 | 2 | ... | 1 | 3 | 9 | 19 | 59 | 55 | 48½ | 30.04 | 29.73 | 29.42 | 20 | W., W.N.W., N.N.W. |
| February, | ... | 5 | ... | 4 | ... | ... | 3 | 7 | 7 | 26 | 63 | 56 | 51 | 30.14 | 29.75 | 29.37 | 6 | W., N.W., S.S.W. |
| March, | 1 | 3 | 2 | .. | ... | ... | 5 | 12 | 7 | 29 | 62 | 58 | 54 | 29.97 | 29.68 | 29.40 | 7 | W., N.N.W., N.W., & N.E. |
| April, | 2 | 4 | 2 | 3 | ... | ... | 3 | 11 | 5 | 30 | 65 | 60 | 56 | 30.10 | 29.77 | 29.44 | 6 | E.N.E., N.E., E. |
| May, | 2 | 1 | 1 | 3 | ... | ... | 5 | 4 | 7 | 23 | 70 | 66 | 62 | 29.99 | 29.71 | 29.44 | 2 | N.W., N., N.N.W. |
| June, | 1 | 2 | 1 | 4 | ... | 1 | 3 | 3 | 7 | 22 | 80 | 73 | 68 | 30.06 | 29.89 | 29.82 | ... | NE., N.N.W., W. |
| July, | 1 | 1 | ... | 1 | ... | ... | 2 | 4 | 1 | 10 | 86 | 82 | 77 | 30.01 | 29.87 | 29.73 | ... | N.E., N.W., S.S.E , S.W. |
| August, | 1 | 1 | ... | 1 | ... | ... | 1 | 8 | 1 | 13 | 85 | 81 | 78 | 29.96 | 29.87 | 29.75 | 1 | N.E., N.W., N. |
| September, | 2 | 10 | ... | 2 | ... | 3 | 2 | 6 | 11 | 45 | 82 | 78 | 76 | 30.01 | 29.92 | 29.84 | ... | N.E., S.S.E., S.E., E.S.E. |
| October, | 2 | 3 | ... | 6 | 1 | ... | 2 | 5 | 5 | 24 | 81 | 75 | 70½ | 30.06 | 29.86 | 29.67 | 7 | S.S.E., E.N.E., N.W. |
| November, | 2 | 4 | ... | 1 | 2 | 1 | 2 | 4 | 5 | 21 | 76½ | 69 | 63 | 30.17 | 29.92 | 29.67 | 6 | N.N.E., S.E., N.W. |
| December, | 4 | 3 | 1 | 1 | 1 | ... | 5 | 4 | 11 | 29 | 64 | 61 | 57½ | 30.29 | 29.88 | 29.48 | 8 | S.S.E., S., W.N.W. |
| Total, | 19 | 40 | 7 | 27 | 6 | 5 | 40 | 71 | 76 | 291 | | | | | | | 63 | |

N. B. In rooms exposed either to the direct action of the sun, or to the strong reflection from the light-coloured walls and houses of Malta stone, the thermometer in July, August, and September often rises to to 95°, particularly about sunset, and the heat continues very oppressive throughout the night. These tables give the temperature of a room shielded in summer from the sun, and in winter from currents of cold air.

In giving a short account of the most interesting cases which have been observed during the two years, the same classification is followed as in the preceding tables, and accordingly some cases of disease of the organs of the nervous system are first noticed, and others of injury, important as affecting these organs.

Lieutenant R., H. M. S. Geyser, 26th January, 1843, of a sanguineous temperament, aged about 30, was attacked, when on leave on shore, with the usual symptoms of *delirium tremens*. On the 24th January ten grains of calomel and two grains of opium were given him by a civil practitioner. The surgeon of the Ceylon was called to him on the 25th, and found that his bowels had not been open for five or six days, and that he had taken no nourishment but brandy and water during that time. He refused to take any medicine, and was sent to hospital on the 26th. Ten grains of calomel were immediately given, and followed by an enema. A drachm of Battley's solution was given at bed time.

27th. Has slept during two or three hours—appears much more rational than on admission, although his manner is still flighty. The enema was repeated, and he took some porter and arrow root. The opiate repeated again at bed time.

28th. Has dosed during the night. Pulse fluttering and soft. As there appeared some fulness of the vessels of the temples, and wild staring of the eyes, the head was ordered to be shaved, with the view of applying cold lotions; but while the barber was proceeding in his duty, the patient suddenly expired.

On examination of the body 26 hours after death, the following appearances were observed.

There was found a large quantity of semigelatinous effusion in the cells of the *pia mater*, raising up the arachnoid from the cerebral convolutions. There was also a small quantity of serum in the ventricles, and about two ounces surrounding the cerebellum. The brain and membranes were otherwise healthy.

The thoracic viscera were healthy.

The liver was much larger than natural, pale yellow in colour, and so soft as to break down into granular masses under the finger. The surface of the kidneys was mottled and lobulated, and the cortical substance on section was found to be in a state of incipient granular degeneration.

Lieutenant E., Polyphemus, February 20, 1843, aged about 40, full habit of body, was attacked when on shore with the usual symptoms of apoplexy. He was bled by a civil surgeon to four pints, numbers of leeches were applied to the head, and tartar-emetic was administered by anal injection. He was admitted to hospital on the same day, in a state of great depression. Pulse scarcely perceptible; pupils dilated; breathing stertorous; skin clammy; perfectly insensible. Warmth, stimulants, and sinapisms were used to endeavour to excite reaction, but without effect, and he sank quite depressed early in the morning of the 21st.

Inspection 12 hours after death disclosed the following appearances.

Arachnoid thicker, firmer, and more opaque than natural. Several firm adhesions between its opposed surfaces towards the vertex. Very slight serous effusion over the superior surface of the cerebral hemispheres, and about half-an ounce of serum surrounding the cerebellum. *Pia mater* infiltrated with a semigelatinous fluid which raised the arachnoid from the surface of the cerebral convolutions, and gave it an opaque milky appearance. The cerebrum and cerebellum were carefully sliced in every direction, but they appeared perfectly healthy. No abnormal quantity of serum in the ventricles.

The heart was flabby, and containing fibrinous coagula. Hypostatic congestion had taken place in the depending parts of right lung. General adhesions of left pleura, and considerable œdema and congestion of the lung, independent of gravitation. About four ounces of bloody serum were contained in each pleural cavity, and two ounces in the pericardium.

The liver was mottled on its surface, and on section, pale yellow, friable and granular, breaking down beneath the finger. Both kidneys were smaller and firmer than natural; mottled and granular on the surface after the removal of the peritoneal coat. The cortical substance was pale, and containing a few small cysts.

H. W., Vernon, June 19, 1843, aged 25, was sent down from Beyrout in a state of extreme debility and emaciation. The action of the heart was irregular, and after a few days severe cephalalgia came on, followed by weakness of intellect, paralysis of the left side of the body and of the left extremities. The head was blistered, the bowels kept open, and nutritious diet with a little wine allowed, but he sank on the 6th of July.

On examination 20 hours after death, very firm adhesion of *dura mater* to the roof of the skull on the left side was found. Extreme softening of right *corpus striatum*, optic thalamus, and cerebral tissue of the inferior part of middle lobe of the cerebrum had taken place On the left side the same changes were observed, but not to so great an extent. No other morbid appearance in the head was observed.

The lungs were healthy. All the cavities of the heart, particularly the left auricle and ventricle, were extremely dilated, the muscular tissue of their walls being soft and flaby. The valves were healthy. About six ounces of clear serum were contained in the pericardium.

Slight injection of small intestines, and incipient granular degeneration of the kidneys were the only changes observed in the abdominal viscera.

G. S., Beacon, March 12, 1844, aged 55, quartermaster, was suddenly attacked on the morning of March 12, 1844, with the usual symptoms of apoplexy. He was bled freely, but died on the afternoon of the same day, without having recovered his sensibility.

Inspection 18 hours after death presented the following appearances.

Considerable turgescence of all the vessels on the surface of the brain. A dark clot of blood, about two inches in circumference and half an inch thick, was lying on the right parietal fossa, and firmly adherent to the arachnoid. It was in the cavity of this membrane, and the separated serum had gravitated to the base of the skull. The *dura mater* corresponding to the clot was red, soft and injected, but the exact source of the hemorrhage could not be detected on the most minute examination. On a section of the brain being made, the cut surface became studded with bloody spots of exudation from the divided vessels, to a much greater amount than usual.

The heart was healthy, and no mark of disease was observed in any other organ.

Several cases of *delirium tremens* have occurred during the two years; one, a lieutenant, cut his throat at an hotel on shore, but recovered. The others, treated by cold affusion, opiates and stimulants, recovered. The only case worthy of particular notice is one in which confirmed insanity remained after the symptoms of *delirium tremens* had ceased.

C. M., Formidable, January 26, 1843, aged 30, a musician, had suffered from attacks of *delirium tremens* during the year 1842. On the 24th January 1843, he became much more outrageous than ever, and attempted to jump overboard. A purgative and opiate were administered, and he was sent to hospital on the 26th. He presented all the usual symptoms of a most severe case of *delirium tremens*, and it was necessary to confine him in a strait waistcoat. A drachm of Battley's solution was given at bed time, and repeated after two hours, but he merely dosed a little.

27th. Perfectly incoherent; suffers greatly from imaginary dangers; pulse, 100, feeble; eyes staring; conjunctiva injected;

talks continually. A cathartic enema was administered, and a large quantity of fetid excrements brought away. Towards evening he became more violent than ever, shouting out songs at the top of his voice. Cold affusions had but little effect in quieting him. The opiates were repeated during the night with some little quieting effect.

28th and 29th. Much in the same state. Same remedies continued with the addition of ten grains of calomel each day. Some porter was allowed.

February 1. Sings and shouts for hours together so loudly as to be heard all over the hospital, although he is separated in a distant ward. Head shaved, cold lotion applied, and cold affusion from a height. Beef-tea given, and the usual opiates.

March 2. No change; has certainly shouted with scarcely any intermission for 48 hours. On the evening of this day the black drop was given in porter, and repeated in drachm doses every hour until he slept. He took four doses and passed a quieter night, sleeping about three hours. A drachm of the black drop was also administered by injection with barley water, and appeared to have more effect than that taken by the mouth. He always attempted to spit out any medicine that was given him.

3d. He appeared considerably depressed, and it became necessary to give him some brandy occasionally. He became quieter and slept after a drachm dose of Battley's solution. This was continued every night until the 8th. He had become quiet, but was quite irrational in his conduct and language; and as it was feared that some organic disease was going on in the brain, a grain of calomel was given three times a day, and continued until the 6th of March, when ptyalism was produced. He was allowed to walk about, and conducted himself properly; but it was evident that his intellect was quite destroyed, and he was sent to England, March 24th.

The chief points of interest in this case were, that he remained without apparent exhaustion, singing and shouting in the loudest possible tones for hours together, and nothing would check him; and it was observed that after any purgative medicine his paroxysms of fear and convulsive struggles were always greatly aggravated.

In two cases insanity was evidently feigned, with the object of obtaining discharge from the service.

G. P., Impregnable, February 24, 1843, aged 45, quartermaster, was stated by the surgeon of the Impregnable to have had "symptoms of mental imbecility for several months past." On the 23d he fell from his hammock and bruised his face; and on the 24th, appearing quite idiotic, he was sent to hospital.

G. H., Impregnable, February 24, 1843, aged 36, A. B., came on board from leave on the 19th, when it was observed that he had "symptoms of aberration of mind. He has strange illusions, such as supposing himself to be a boy, and doing duty with a convict gang."

Some suspicion of feigned insanity was excited by the fact of these two men coming from the same ship at the same time. There was also a similarity in the expression of their features, which, as it was constant when they were under observation, was most probably assumed. They also continually persisted in the same story, instead of exhibiting the rapid transition to other subjects, and the difficulty of recalling the same train of thought, usually observed in the insane. It was discovered, also, that they had an object in obtaining their discharge from the service. They were therefore made to understand that their artifice had been detected, and some simple medicine being given to afford them an opportunity of attributing their recovery to some cause, they soon became quite rational, and were discharged to their duty perfectly well, one on the 14th, and the other on the 27th of March.

Of the cases of injury affecting the nervous centres, two call for particular notice.

C. S., aged 22, Formidable, October 6, 1844, whilst bathing, jumped from the anchor and fell with his back across the gunwale of the pinnace. He was brought up sensible, complaining of excessive pain across the loins. There were marks of contusion along the back and on right shoulder. He had the usual symptoms of shock and depression of the system, with bloody sputa. He was brought immediately to hospital, and reaction not having commenced, a little wine was given and urine drawn off by catheter. Great contusion on back, and evident protrusion of spinous processes of lower dorsal vertebræ. Some loss of power over lower extremities, but sensation in them remains unimpaired. Pulse, 100. The body was raised and supported by pillows, and the thighs flexed upon the abdomen, that being the easiest position he could find.

7th. No excessive reaction. Pulse, 100. Excruciating pain in back and abdomen. It was necessary to pass the catheter three times. Urine clear. Passes stools involuntarily.

8th. Pulse, 100; incompressible. On stethoscopic examination, pneumonia of right lung detected in its first stage. Was bled to ten ounces with relief, the blood being buffed and cupped. Sensation perfect in thighs and legs, not in feet. Can move the legs, not the feet. Catheter still used. Stools involuntary. An opiate was given at bedtime and afforded him great relief.

9th. No change. Two grains of calomel were given.

10th. Considerable tympanites; no other change. The sphincter ani is so much relaxed, that the anus would readily admit two or three fingers, and it was therefore impossible to administer an enema, as the fluid returned immediately after its injection.

11th. Evident displacement of the three lower dorsal vertebræ; impossible to detect any fracture, but the projection of the spinous processes is quite evident to eye and touch. Fifteen leeches applied over the projecting portion.

15th. The breath has become very fetid. Fæces still pass involuntarily, and it is necessary to pass the catheter every two or three hours to relieve him from pain in the region of the bladder. The urine is very high coloured, excessively offensive, and loaded with ammoniacal phosphates and mucus. Always necessary to give opiates at night.

16th, 17th. Bowels not having been opened, purgatives were given. His appetite is beginning to return, and he was allowed some pudding, having before been on milk diet.

20th. Some fish allowed. The catheter is no longer required, as the urine begins to dribble away involuntarily. A bed sore has formed over the sacrum.

27th. Has remained in same state, the urine dribbling away. Bowels requiring purgatives which operate involuntarily. A slough has separated from the bed sore.

November 1. Begins to be able to retain about a wineglassful of urine in the bladder.

5th. Has very little power over lower extremities, but can sit in a chair while his bed is made.

16th. With assistance of crutches can walk several yards. Urine very offensive.

18th. Bowels latterly have been obstinately confined; every third day croton oil has been given. He takes three drops before it operates, and other purgatives are inefficacious.

20th. Is obtaining more power over the bladder, and can retain nearly half a pint of urine.

22d. Begins to feel that he has some power in assisting expulsion of the fæces.

December 5. Bowels are becoming sensible to the stimulus of castor oil. For the last week has walked a little daily.

20th. Walks about with the assistance of a walking stick only. His general health improving. Still some projection of spine remaining. Is shorter than before the accident. Has perfect power over his urine, and the bowels act with the dose of one drachm of compound jalap powder.

He was discharged invalided, December 27, for a passage to England.

T. A., Aigle, September 27, 1844, admitted at 3 P. M., having just fallen from the main top to the deck of the Aigle.

He was talking deliriously, and the extremities were convulsed. There was a wound over the right superciliary ridge extending outwards, and dividing the temporal muscle down to the bone. A depressed fracture of a circular portion of the frontal bone was at once detected, in the centre of which was the ridge of the temporal process. The external table came away easily by the forceps, when a larger circle of internal table was found to be deeply depressed and broken into several pieces, these pieces being overhung by edges of the opening left by the removal of the fractured portion of external table. The pieces of depressed internal table were carefully removed by elevator and forceps, and it appeared that the *dura mater* was but slightly injured. There was considerable bleeding from a branch of the middle meningeal artery, and much oozing from the diploe of the bone. When this ceased, simple cold water dressing was applied. During the removal of the bone he was quite insensible intellectually, but physical sensation appeared augmented, as flies which settled on the face produced violent contractions of the facial muscles. He was very noisy, using obscene language. After the removal of the bone he became quiet, but depressed. The pulse was very feeble; the extremities cold; the pupils sluggish but contractile. Warmth was applied to legs and body, and at 10 P. M. reaction commencing, a castor oil injection was administered and the catheter passed.

28th. Passed restless night, but is partially sensible, having asked the nurse what was in the bandage box. Pulse, 88. It was necessary to pass the catheter morning and evening.

29th. Has been so restless that it was necessary to confine him in a strait waistcoat; pulse, 84; partially delirious, but answers questions rationally, and knew his brother and a messmate who were in the ward. Pupils sluggish, but contractile. Enema administered and catheter passed morning and evening.

30th. Catheter was passed in the morning, but at mid-day he passed urine naturally, and got out of bed to the close stool. Pulse, 84; skin natural. Straps of adhesive plaster, which had been applied on the 28th in such a manner as to approximate the edges of the wound, leaving opening sufficient for any escape of matter, were removed, and a great portion of the wound had healed by first intention, leaving an opening over the spot where the bone was wanting. A little purulent matter in this opening moves with the pulsations of the brain. Water dressing only used.

December 1. Urine passes naturally. Still delirious and flighty in manner, but answers questions rationally and knows his friends. Pulse, 80, soft; skin cool. It is necessary to confine his hands, to prevent him from tearing the dressings from the wound.

2d and 3d. Improving. Wound nearly united, but gapes over lost bone. Considerable discharge of healthy purulent matter.

He continued gradually improving in every respect, and on the 20th a dulness of manner was the only bad symptom, except that the pulse was always under 50, and occasionally intermittent. He walks about, takes his food with appetite, is quite rational, and says that every hour or two he has a sharp pain in the seat of fracture, which, however, soon goes off.

27th. Wound being healed, and slowness and irregularity of pulse being the only mark of anything wrong in the system, he was invalided and discharged for a passage to England.

Of the diseases and injuries of the organs of the senses, those of the eye have alone been of any importance. Several severe cases of conjunctivitis and iritis have yielded to the usual methods of treatment. In two cases of general inflammation of the eye from injury—one from lime blown between the eyelids, the other from the accidental explosion of a thirty-two pounder just before the eye—the cornea gave way, prolapsus of the iris, escape of the lens, and loss of the eye followed. In the case of a French officer, who was received in a state of insensibility after a fall on deck, bleeding from the ear continued for two days; but after the effects of concussion had gone off, no bad symptom remained, and he was discharged quite well a week after admission.

### *Diseases of the Respiratory Organs.*

The proportion of deaths from phthisis has been 15 per cent. of deaths from all causes. In other years this proportion has usually been 30 per cent. In the case of a man named Coombs, of the Resistance, it was remarkable that the *lower* lobe of the right lung was the principal seat of the tubercular deposit, the upper lobe presenting merely a few miliary tubercles and a few small cavities about the size of a pea. The case of a man who was invalided was a very remarkable one. A seaman of the Aigle, named Ashworth, had long presented the general symptoms of phthisis. An abscess formed in the right axilla, which was taken for a suppurating gland and opened. Air escaped with the purulent matter, and it became evident that a communication was established between the bronchial tubes and the opening in the axilla. He was admitted in an extreme state of emaciation and hectic, apparently in the last stage of phthisis. On stethoscopic examination, it appeared, from the situation of the dulness on percussion, and the healthy sound of the respiratory murmur in other parts of the lung, that the upper lobe of the right lung was the sole diseased portion. Large quantities of discharge, resembling the expectorated matters of phthisical patients continually passed from the axillary opening, the hectic diminished, and his health began gradually to improve. Sedative medicines and light nutritious diet were prescribed, and the fistulous opening left entirely to nature. The discharge diminished, the opening closed, cough and expectoration nearly ceased; he began to walk about and recover his health and spirits; and at the time of his discharge for a passage to England, dulness of the right subclavicular region was the only mark of any disease about him. I have not yet learned the ultimate result of this case, or I should have given more minute details, as it has a most important bearing upon the proposition recently made of making incisions into the lungs in cases of phthisis. It would support the supposition, that if the tubercular deposit be circumscribed, and the pleuræ were adherent, a free external opening might be of great service by obviating the necessity for bronchial irritation, and consequent disturbance of the general system, in the discharge of the softened tubercle.

Two cases of gangrene of the lung have occurred, in one accompanied by a peculiar change in the blood of the great venous trunks and cerebral sinuses, probably dependent upon the entrance into the pulmonary veins of some of the gangrenous portions of lung.

J. P., aged 33, Howe, 6th March 1843, a marine, was put on the sick list of the Howe, February 27th, complaining of excruciating pain in the left ear, shooting over the same side of his face, with some headach and occasional vertigo, but accompanied by no febrile disturbance. He was freely purged, fomented, and tepid injections were thrown into the affected ear. On the following day, the otalgia continuing, a blister was applied to the back of the ear, which was kept discharging for some days, but with little relief. On the evening of the 3d, some lymphy discharge was observed from the external meatus, and he expressed himself somewhat easier. At noon on the following day, he had a severe rigor, followed by heat of skin and copious perspiration, and the rigor recurred on the day of admission. He has considerable heat of skin and other febrile symptoms, and the stethoscope proved the existence of extensive pneumonia of the right lung. The pulse being low, and the lips bluish and cold, general bleeding was not practised, but ten grains of calomel were immediately given.

7th. No change. Two grains of calomel ordered every second hour. In the evening some increase of fever came on, and he was bled to 14 ounces. The blood did not coagulate, but formed a grumous dark-coloured gelatinous mass. A full opiate was given at night.

8th. Easier, but evidently depressed. Whole of right side of chest quite dull, and at the lower part loud moist rhonchi are heard; breath rather cold and fetid; pulse irregular. Beef tea was ordered, and the calomel continued.

9th. Same as yesterday; rhonchi larger and moister. More pain in the side came on in the evening, and twelve leeches were applied. The opiate repeated at night.

10th. Had a very severe rigor at 5 A. M. Calomel continued, the gums not being affected; breath and expectoration fetid. No doubt as to the existence of gangrene of the lung. Wine was given, but he continued to sink, and died on the 11th.

On examination sixteen hours after death, no morbid appearance was observed in the cranium, except in the left lateral sinus, which, immediately before it leaves the skull, was dilated to the size of an almond by an adherent clot. Its internal membrane was red, and the external coat had begun to slough. The preparation has been sent to Haslar Museum.

The right lung was almost wholly destroyed by gangrene, a small part of the upper lobe in a state of red hepatization being the only non-gangrenous part. Imperfect attempts had been made to circumscribe portions of dead lung, giving an appearance of distinct bags of fetid slough. The most perfectly formed of these bags was in the lower lobe, and had discharged its contents into the pleural cavity, which contained about two pints of fetid greenish serum, mixed with shreds of lymph. The whole surface of the pleura was covered by layers of dark-coloured and slightly adherent lymph. The left lung was much engorged, and a small point in its lower lobe had become gangrenous, but was distinctly circumscribed by indurated pulmonary tissue. The pericardium contained about four ounces of flaky serum, and its surface towards the apex and posteriorly, were adherent by recently organised lymph. The liver was very large, reaching to the pelvis, but presented no perceptible change of structure, except on the right side of its diaphragmatic surface. Here it was dark-coloured and friable. No other morbid appearance in abdomen or pelvis.

The blood in the vessels was very dark-coloured, and that in the pulmonary veins on the right side was coagulated. No deposit of purulent matter in any organ.

W. W., aged 27, Queen, February 3, 1844, A. B., was placed upon the sick list January 20th, with acute pain in the left side, much aggravated by any deep inspiration. Pulse 88; skin moist; tongue clean. The symptoms continued acute for nearly forty-eight hours, during which time venesections to the extent of 82 oz. were had recourse to in five distinct periods, followed by calomel and opium. The patient said he was much relieved after each bleeding; blisters and purgatives were employed; the active symptoms ceased; depression followed; tonics, a nutritious diet, and opiates at bed-time were ordered. He was sent to hospital February 3d, with cold fetid breath, blue lips, and scarcely perceptible pulse, and died eighteen hours afterwards.

On examination twenty-six hours after death, the right lung and pleura were found to be healthy. There were firm recent adhesions of pleura over lower lobe of left lung. On endeavouring to separate these adhesions, the lung gave way, and a large quantity of fetid matter was discharged from an immense abscess, which occupied nearly the whole of the lower lobe of the lung, and all that part of the upper lobe contiguous to the mediastinum. The lung surrounding the abscess was in a state of grey hepatization, in some spots gangrene having just commenced. The abscess was distinctly encysted by condensed pulmonary tissue, and by a layer of coagulable lymph of considerable firmness. Heart large and flabby, but otherwise healthy.

Liver very much enlarged, but not apparently diseased in structure. Other abdominal viscera healthy.

Two cases of feigned dumbness have been admitted and detected. Both men were excessively obstinate, remaining several months without speaking. They were given to understand that they would not obtain their object of being sent to England, but would be kept in hospital until they spoke. One was bled to a small amount to give him an excuse for speaking, and tired of his deception, he spoke next morning as well as ever, and returned and continued at his duty. The other was made to practise whispering syllables and words, gradually increasing the tone. He was discharged to duty, and subsequently reattempted the same trick on board the Ceylon. The chief grounds of suspicion in these cases were, that no disease of the brain, or of the vocal or respiratory organs could be detected; the motions of the tongue were perfect; and the men had an object to gain by obtaining discharge from the service.

### *Diseases of the Organs of Circulation.*

W. C., aged 30, Savage, August 9, 1843, a marine, had suffered since June with attacks of dyspnœa and bronchitis, He was admitted with all the symptoms of obstructed pulmonary circulation, blueness of surface, œdema, and turbulent action of the heart, with loud double bruit. He was bled to fifteen ounces, and relieved for a time; but the symptoms all returned, became aggravated, and he died sixteen days after admission.

Both lungs were found extremely congested, and about a pint of serum in the right pleural cavity.

Four ounces of fluid were contained in the pericardial cavity. The heart was much enlarged by hypertrophy and dilatation of all its cavities. The pulmonary and tricuspid valves were healthy. The aortic orifice was in a state of permanent patency from disease of its valves, which were covered by vegetations, and one of them was perforated, leaving a small opening. The mitral valves were also thickened, and a small tumour of the size of a pea had formed in one of their divisions. All the cavities were much distended by blood and fibrinous coagula.

Liver extremely congested. No other sign of abdominal disease.

R. C., aged 38, Hecla, 29th September 1844, able seaman, had frequently suffered from attacks of dyspnœa and palpitation, and had been relieved by bleeding, digitalis, and low diet. He was admitted on account of a more severe attack than usual, but soon got over it with quiet, low diet, and small doses of calomel and antimony. The pulse at the wrist, and over the brachial and axillary arteries of left side, was always almost imperceptible, that on the right side of natural strength. A rough *bruit de soufflet* was often heard over the arch of the aorta, but was by no means constantly present. He appeared in a very fair state of health, but died very suddenly, November 21.

The lungs were found to be excessively gorged with blood. The heart appeared much larger than natural, but this was more from distension than from increase of structure. The auricles, coronary veins, and superior cava were enormously distended, and a considerable quantity of fibrine had formed in the ventricles. The aortic valves were hardened, thickened, and contracted; contracting also to some extent the aortic orifice. The ascending aorta, its arch, and a few inches of its descending portion, were studded with atheromatous deposit between the internal and middle coats, and the internal coat in some few spots had ulcerated. This deposit was most considerable about the origin of the left subclavian artery, and the mouth of this vessel was so much contracted as scarcely to admit the end of a small blowpipe.

Liver and kidneys excessively congested. No other morbid appearance in abdominal organs.

Cases of phlebitis have occurred, but in every case as the result of erysipelas, or of absorption from gangrenous abscess.

## *Diseases of the Digestive Organs.*

None of the cases of disease of these organs have been of sufficient interest to call for particular notice. Of their injuries it is only necessary to refer to the case of Dr Martin, the late head of this establishment, who was shot by a soldier on sentry, supposed to be insane. The Doctor died forty minutes after the shot, the ball having passed from behind, shattering the right kidney, dividing two folds of small intestine, and passing out to the left of the umbilicus.

A curious case of abscess in the roof of the mouth was observed in a man named Herman, of the Formidable. It was opened, and most profuse arterial hemorrhage resisted all attempts at compression. A canine tooth which was decayed was drawn to gain a better view of the cavity of the abscess, in order to detect and tie the bleeding vessel, but the bleeding stopped directly after the tooth was drawn, and did not return.

## *Diseases of the Genito-Urinary Organs.*

Four cases of extravasation of urine have occurred during the year, two from rupture of the bladder, and two from rupture or ulceration of the urethra. The two former formed the subject of a paper which I transmitted last year, on rupture of the bladder external to the peritoneal cavity, in which I endeavoured to show that, if immediately after any accident likely to injure the bladder, severe pain follow in the hypogastric region, with passage of blood or bloody urine by the catheter, if more than a small quantity of fluid is never voided at one time nor drawn off by the catheter, if a peculiar sensation of pressure against the point of the catheter be felt, and if these symptoms be unaccompanied by the extreme prostration of strength and depression of pulse which always follow peritoneal perforation, rupture of the bladder external to the peritoneum may fairly be inferred, and treatment founded on that inference. This treatment would be to make a free opening through the deep pelvic fascia, to allow a free escape to the urine infiltrated into the pelvic cellular tissue, and to keep a catheter constantly in the urethra to prevent further infiltration.

Of the cases of ruptured urethra, one arose from a lieutenant who was subject to stricture passing a catheter himself, and rupturing the membranous portion of the urethra. Perineal abscess followed, which was fortunately circumscribed; but after it had been opened, urinary fistula remained. The case was a tedious, but a most successful one. He was kept several weeks in bed, wearing a catheter constantly in the bladder, so that not a drop of urine could pass through the fistulous opening, which gradually closed, and the patient was discharged perfectly cured not only of the perineal fistula, but also of his original stricture. A man in hospital at present, who has been subject for several years to stricture and urinary fistula, is undergoing similar treatment, and it appears extremely probable that the same favourable result will be obtained.

The other case of ruptured urethra proved fatal.

Mr S. G. H., Geyser, 16th December 1844, had been on the sick list since the 6th with symptoms of a low form of intermittent fever. It afterwards appeared that he had been subject to stricture, and had some days before had a fall, in which the perineum received the principal shock. On the 14th he complained of severe pain in the testicles, and the scrotum became œdematous. After admission to hospital it became evident that extravasation of urine had taken place, and free incisions were made through the deep fascia to allow of its evacuation, but he sank under the constitutional effects of the extensive sloughing, notwithstanding the free use of wine and opium, and died December 18.

On examination, the abdominal organs were found to be in a perfectly healthy state, without any sign of peritonitis. The cellular tissue of the pelvis, anteriorly below the reflection of the peritoneum, formed an immense sloughing abscess, which passed downwards on the right side, along the course of the cord to the perineum and recto-ischiatic spaces. On a metallic bougie being introduced by the urethra, it passed into this abscess through an ulcerated opening in the urethra, just where this canal passes through the triangular ligament. The urethra in this situation had evidently been the seat of chronic disease, its coats being hard and thickened. The edges of the opening were rounded off. The urethra at its external orifice was so small as scarcely to admit the smallest sized bougie; but after the first inch its calibre was natural throughout. The bladder was perfectly healthy.

In another case somewhat similar, but much more chronic, death also was the result.

Mr F., aged 32, Lizard, clerk in charge, 27th December 1842, had suffered many years from stricture. He was admitted in a state of confirmed ill health, with great irritability of the urethra. Perineal abscess formed, was opened, and permanent urinary fistula remained, with profuse suppurative discharge, and he died extremely emaciated, February 3, 1843.

The genito-urinary organs were the sole seats of disease. A small stricture existed about one inch from the meatus, and from this to the membranous portion, the urethra appeared healthy. At the latter situation the mucous membrane was black and ulcerated, and opened into a large abscess, which filled the space between the rectum and bladder and recto-ischiatic spaces. It was distinctly encysted, and its walls were black and fœtid. The prostate was healthy, the bladder much contracted, and both ureters much dilated. The whole of the mucous membrane, from the membranous portion of the urethra, through both ureters into the pelvis of both kidneys, was in a black sloughy state, and presented numerous points of ulceration. Both kidneys were in an advanced stage of granular degeneration.

With regard to renal disease, I have nothing to add to the remarks made in a former report published in the Edinburgh Medical and Surgical Journal, except that in 31 *post mortem* examinations, the kidneys were diseased in 10 cases, 4 of these being only congestion dependent upon disease of other organs, the other 6 being more or less advanced stages of granular degeneration.

The few cases shown in the table as disease of organs of locomotion have been either some affection of the joints, bones, or periosteum with osseous disease; but only one presented anything of interest. In this case extensive superficial necrosis of the femur was found after death, which had resulted from an immense sloughing abscess of the thigh. It was not at all clear from the symptoms whether disease of bone, cartilage, or periosteum, erysipelas, or phlebitis, had been the primary disease; but the man died in a state of extreme emaciation from their combined effects.

William Johnston, aged 35, H.M.S. Impregnable, January 14, 1843, a marine, was admitted on account of supposed rheumatism of the right knee. Matter formed beneath the deep fascia of the thigh, the femoral vein became knotty and swollen, and emphysema became very distinct in the inner part of the thigh, and afterwards extended above Poupart's ligament. Free openings were made, and excessive fetid discharge continued, notwithstanding the use of wine, porter, quinine, and generous diet; and he died completely worn out on the 8th of February.

Inspection presented the following appearances.

Fibrinous coagula were found in the right cavities of the heart, extending along the venous trunks. The *vena cava ascendens* was considerably distended by air, not fetid. The internal iliac veins on both sides were healthy; the left external contained some partially-adherent clots, and the right was completely occluded by fibrinous clots, which were slightly adherent to the reddened internal membrane. The femoral and popliteal veins on this side were in a similar condition.

Scarcely a trace of any of the muscles of the thigh remained; the bone, covered by shreds of gangrenous cellular and fibrous tissues, running through the centre of an enormous abscess with sloughy walls. At the popliteal space the cavity of the knee-joint communicated with this abscess and was filled with the fetid débris of the tissues of the thigh, the cartilages of the articulating surfaces of the femur, patella, and tibia being in a great measure removed. Extensive superficial necrosis of the femur had taken place. No purulent matter was found in any of the veins, nor purulent deposit in any organ. The knee-joint was the only one which had been the seat of disease.

The cases of disease in the columns of "Tegumentary and Fibrous" were either cases of rheumatism, with scarcely an exception chronic—and ulcers not the result of injury—none call for particular notice. The iodide of potassium appears to be the most useful remedy in the chronic rheumatism of this climate; some very obstinate cases having readily yielded to this remedy, in the dose of eight grains three times a-day.

### *Wounds and Injuries.*

The cases of dislocation have been 2 of the femur and 1 of the ulna backwards. Among those of fracture there have been 6 of the femur, 1 compound of tibia and fibula, 3 of the fibula, 2 of the clavicle, 1 of the humerus, 3 of both bones of the forearm, 1 of the radius, 1 of the malar bone, and 1 of a rib.

One of the cases of dislocation of the thigh was into the sciatic notch. The reduction occupied nearly two hours, because when extension was applied, the head of the bone slipped from the sciatic notch into the *foramen ovale.* The extension was reapplied, and it returned to the sciatic notch. A third attempt was more fortunate, very little inflammation followed, and the man returned to his duty perfectly well.

The other case was one of dislocation into the *foramen ovale.* It was easily reduced without the assistance of pulleys. The man died two hours after admission, having, by a fall from the mainyard of the Queen, fractured his sacrum, pelvis, and left femur; dislocated the right femur, and fractured the humerus and scapula, driving portions of the bones forming the articular cavity through the skin. The capsular ligament of the right thigh and surrounding muscles were found extensively lacerated. The *ligamentum rotundum* was torn from its attachment to the head of the femur, and a small piece of this bone remained attached to it.

Of the cases of fracture of the femur one died, being complicated by fracture of the skull and compound dislocation of the ankle. Four of the others were treated on the plan of straight extension, and one, being very high up, on the inclined plane. All terminated favourably. All the other fractures united favourably, except one of compound comminuted fracture of both bones of the forearm. The man is still in hospital; and it appears that a false joint has formed, or is forming between the ends of the bone. Some disease of the bone also appears to be going on, and it is possible that amputation may become necessary.

There have been many cases of compound fractures of the carpal and metacarpal, tarsal and metatarsal bones. In the treatment of all, the principle has been strictly observed of saving as much of the hand or foot as possible, excising injured portions of bone by bone-nippers or the chain saw. Some cases in which amputation of the hand seemed necessary have terminated very favourably, with the loss of only one, two, or three fingers.

In one case of wound of the knee-joint by a piece of broken glass, acute synovitis followed. The treatment consisted of local bleeding, tartar emetic, blisters, cold applications, and perfect quiet of the joint, and the boy returned to his duty.

A curious case of epistaxis occurred. A man having fallen upon a sacking needle, which passed deeply into the nasal fossæ, the wound was followed by profuse hæmorrhage. The nares were plugged with the assistance of Dupuytren's canula, and the bleeding was stopped. No ill effects followed beyond those from the loss of blood.

*Specific diseases.*—The following are the numbers of these diseases received during the two years in 1843–44.

| | 1843. | 1844. |
|---|---|---|
| Syphilis, | 43 | 27 |
| Fever, | 42 | 32 |
| Erysipelas, | 8 | 4 |
| Gonorrhœa, | 2 | 1 |
| Variola, | 2 | 9 |
| Scarlatina, | 1 | — |
| Cellulitis venenata, | — | 1 |
| Purpura, | — | 1 |
| | 98 | 75 |

Of these cases it is only necessary to remark, that the character of syphilis has been mild during the period of this report,—the generality of the cases being buboes, often followed by burrowing sinuses in the groin, or the common form of secondary symptoms.

Of the fevers in 1843 about half were cases of common synochus, the remainder were patients recovering from the remittent fever with which they were attacked during the expedition to obtain the Xanthian marbles. In 1844, twelve were cases of remittent fever, which had been prevalent on board the Formidable at Gibraltar, although there was no such fever in the town or garrison, or in other ships in the bay. The active symptoms had ceased before their admission here. The other cases of fever were ephemeral, and there has been severe typhus here during these two years among the seamen. Bilious remittent has been prevalent this autumn among the soldiers and the native inhabitants, but the navy has entirely escaped. Several of the cases of erysipelas have been severe, and followed by extensive sloughing of the affected parts; one proved fatal, cerebral effusion having come on. The cases of variola have been without exception of a severe confluent character. Besides these nine returned in this year's report, four others received for other diseases were attacked, but only one of these could have been infected while in hospital. In two cases death followed from pulmonary and cerebral complication. The disease was very prevalent in the island at the time, particularly among children. A large proportion of adults who were revaccinated, took the vaccinia, and most of those affected with variola had been vaccinated as children.

The case of *cellulitis venenata* requires particular notice.

Mr H. W., aged 24, assistant-surgeon of H. M. S. Formidable, March 13, 1844, while dissecting a subject dead from phthisis on 9th of March, punctured the index finger of the right hand. The puncture was so small that he felt scarcely sure that the hook had penetrated the skin. Slight redness and hardness came on the next day, with some pain and slight constitutional irritation. He took a purgative, and on the 11th the pain and hardness having increased, he made a small incision in the situation of the puncture. He complained a good deal of headach and languor, and was put on the sick-list on the 12th, when the small incision he had made was increased and carried down to the bone on the dorsum of the first phalanx. Fomentations and poultices were applied, and he was purged.

13th. Pain in hand continuing severe, and tumefaction of hand and forearm coming on and increasing, with no abatement of the constitutional disturbances, he was sent to hospital. On admission, an agitated tremulous manner were the only marks of disease which could excite apprehension. The pulse was 100 and small, and his spirits much dejected. The wound of the finger looked unhealthy, discharging a pale serous fluid. Slight tumefaction of the forearm without redness, but very painful on pressure. Thirty-six leeches were immediately applied to the arm, and a saline purgative administered.

14th. Has passed a restless night. Pain in arm still severe, and some redness in the inner part of the upper arm and pain in the axilla have come on. Pulse 100, fuller and louder. Skin warm and headach intense; he was bled to 18 ounces, and saline medicine given every two hours. He asked particularly for lemonade, which he was allowed to take at pleasure. Soon after the bleeding the pulse became soft and fell to 90, but in the evening it had risen to 120 and became jerking. Five grains of calomel were given.

15th. Redness of arm and pain in axilla diminished. Has not slept. No other change. Spirit lotion applied to the arm.

16th. Bowels open, but stools dark and fetid. Five grains of calomel were given. Pulse 120, feeble. Some fish was given. In the afternoon he complained a good deal of flatulent eructations, and a draught of magnesia and tincture of cardamoms was given with relief. The arm was tumid, and resembling the appearance of the leg in cases of *phlegmasia dolens*. It felt doughy to the touch. The serous discharge from the finger very copious. Considerable nervous irritability came on towards evening, when it became necessary to order some wine and porter, with a full opiate at bed-time.

17th. Pulse scarcely perceptible, 140; breathing hurried; voice interrupted, but more composed in his mind. Has slept well. Much troubled with flatulence, for which draughts of the compound tincture of cardamoms were ordered. Wine and porter were given freely, but he continued to sink, and died at 10 P. M.

On examination of the body 36 hours after death, the following appearances were recognised.

The heart was found very much distended by fibrinous coagula, which adhered very firmly to the walls of its cavities. There was also some hypertrophy of the left ventricle. Old adhesions of both pleura superiorly and anteriorly, and extensive infiltration of both lungs with bloody serum.

The cellular tissue of the right hand, forearm, and part of the upper arm was thickened and infiltrated with a dark coloured serous fluid. By an accidental fall of the integument some of this fluid was splashed into my eyes; but slight irritation of the conjunctiva was the sole result. From the dorsum of the carpal phalanx of the index finger, where the puncture and incisions had been made, a vein filled with purulent matter passed to the superficial radial vein, and on to the median cephalic. As this vein proceeded up the forearm, coagulable lymph lined its internal coat in distinct layers, which became thicker before the junction with the median basilic, and here so completely plugged the vein, that the entrance of purulent matter into the deeper veins was prevented. The blood for some distance along the brachial veins was clotted, and their internal coats reddened. Nothing was observed in the course of the examination which could lead to the inference that purulent matter had entered the general circulation.

### *Purpura.*

J. C., A. B., aged 27, Formidable, 5th June 1844, complained on the 30th of May of slight headach, cough with scanty expectoration tinged with dark-coloured blood. The gums were spongy, and dark-coloured blood exuded from them as well as from two or three abraded purple spots on the mucous lining of the mouth, unaccompanied by further general symptoms than a feeling of languor and debility. Between this date and his admission to hospital, the bleeding from the mouth increased, amounting to about a pint and a half mixed with saliva and expectorated mucus in the 24 hours. A few purple spots were noticed on the right cheek, and on the day of admission over the clavicles, nates, and legs. Strong astringent gargles were used, and nitrate of silver applied to the spots within the mouth. He took three drachms of nitrate of potash daily, and was allowed a very generous diet, with fresh fruits. After admission a purgative brought away an immense quantity of feculent matter, followed by the black evacuations produced by the action of the acid contents of the intestines upon the blood effused into their canal. He was ordered fowl with beef tea and porter, and half a pint of port wine daily, with the cream of tartar drink.

6th. Typhoid symptoms increasing with severe rigors, three grains of quinine were ordered every four hours. Other treatment as before. Stupor, stertor, and other symptoms of cerebral effusion came on and increased, and he died on the morning of the 7th.

On examination 24 hours after death, the following appearances were found.

The purple spots on the surface had almost disappeared, with the exception of one or two on the wrists and cheeks, in which the cuticle had been raised by extravasated blood.

The vessels on the superior surface of the brain were turgid with dark fluid blood. The substance of cerebrum and cerebellum was healthy, with the exception of the parts around the right lateral ventricle. This cavity was distended by about two ounces of blood, partly fluid, partly dark adherent coagula. The greatest quantity was in the posterior horn of the ventricle, and the surrounding cerebral tissue was softened and broken down. A considerable quantity of blood had made its way through the softened cerebral tissue, and diffused itself beneath the arachnoid, around the convolutions in the cells of the *pia mater*. The effusion had apparently proceeded from the choroid plexus, which was much enlarged, pale and very fragile. The left ventricle contained only bloody serum; but the blood itself had extended into the fourth ventricle.

The lungs presented many purple spots on their pleural surface, but showed no other sign of disease. Similar spots were seen on the reflected layer of the pericardium, and the whole surface of the heart was studded with bright spots, the left ventricle being dark and livid apparently from a confluence of similar spots.

A few similar spots appeared on the peritoneal surface of the liver, and there was slight dark-coloured injection of small intestines, principally in the duodenum. The mucous membrane of the stomach was injected throughout in the punctated form. The spleen and pancreas, also the kidneys and bladder were healthy.

### *Carcinoma.*

When speaking of diseases of the digestive organs, I omitted to relate a case which may, perhaps, with equal propriety, be classed among specific diseases.

J. B., aged 47, Indus, a marine, 6th September 1843, had long suffered from dyspepsia, with generally impaired health. Emaciation progressively increased, anasarca and ascites supervened, and he died, January 28, 1844, without having complained of any symptom of hepatic disease.

The surfaces of both lungs were covered by the spurious punctiform melanosis of Carswell. The only other abnormal appearance in the thorax was caused by the presence of a semi-gelatinous effusion between the pericardium and muscular tissue of the heart. It was yellowish and in considerable quantity.

In the abdomen the liver and kidneys were the only organs in a morbid condition. The former was enlarged and its surface studded with light-coloured lobular elevations. On making a section it appeared that these were caused by carcinomatous tumours distributed throughout the substance of the liver, and varying in size from that of a mustard seed to that of a large walnut. One of the largest was in the *lobulus Spigelii.* In many vascularity was very evident; minute vessels being very distinct and numerous on the circumference of the tumours and radiating towards their centres. The vascularity was most evident in the softest of the tumours. The deposit existed in the form of lardaceous and mammary sarcoma. In none of tumours was the process of softening sufficiently advanced to give them a medullary character. The presence of carcinomatous matter could not be traced in any of the veins of the liver. Both kidneys were hard, very pale, and their surface presented the appearance of granular degeneration.

Specimens of this disease, and of all others of interest, have been prepared for the museum of Haslar Hospital.

*Malta Hospital,*
*December* 31, 1844.

## ART. II.—*Case of immense accumulation of indurated Fæces in the Rectum, and complete suppression of Alvine Evacuations for a month.* By EDWARD HOCKEN, M.D., F.R.M.C.S. Physician to the Blenheim Street Infirmary, &c.*

ON the 10th of June 1844, at the request of Mr Whidborne of Queen Square, I accompanied him to the New Road to see Mrs Jones, aged 46, to whom he had been called two days previously. We found the patient, who had been ill for some months, considerably emaciated, and with a very feeble pulse, beating 136 in the minute. She complained of great agony in the rectum and lower part of the belly, which latter on examination was found to be distended, firm, and very intolerant of pressure. The cœcum, sigmoid flexure of the colon, and along the course of the colon generally, were the parts most palpably distended. She had not passed any fæces for a month, and injections *per anum*, which had been frequently used during that time, came away only slightly coloured. She complained of constant vomiting on taking food, which she rejected unchanged a few minutes after it was swallowed. Even liquids in small quantities rarely remained on the stomach. Some weeks since, vomiting had been even more urgent than at present; violent retching having frequently occurred quite independently of food, and at that time she brought away by the mouth dark-coloured matters, which the female attendant stated to have smelt very offensively. Moreover, there was a muco-purulent discharge from the vagina. Previous to her being seen purgatives had been administered, and we now found the patient suffering from their effects, being obliged to go to stool frequently, whilst every attempt occasioned the most frightful agony, with eversion of a portion of the rectum through the sphincter. On making an examination the rectum was found completely impacted, and enormously distended by fæces of extreme hardness to within an inch of the anus, bulging into and nearly obliterating the vagina. The rectum was so intolerant of pressure that the mere introduction of the finger occasioned the greatest agony. It was therefore determined to soothe this condition as far as possible, before anything was undertaken to relieve the rectum from its load. An opiate suppository was directed, and a draught with hyoscyamus in the evening, intending to obtain the surgical advice and assistance of my friend and colleague Mr Storks in the morning.

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* Read before the Royal Medical and Chirurgical Society, Nov. 26th 1844.

The history which the woman gave of the commencement of her illness was to the following effect. About three months previously, whilst nursing a child, she fell over a tray, by which her thighs were widely and violently separated. She experienced, at the time of the accident, much pain followed by a continued discharge of blood from the vagina, and from that date experienced pain and difficulty in voiding the contents of the bowels; large lumps being often passed marked by the sacculi of the colon. This difficulty, and the lumpy consistent character of the fæces, gradually increased until it was entirely suppressed about a month since, and she has not passed any thing *per rectum* (with the exception of a sufficiency to colour the enemata, which were used slightly) up to the present date. During her illness she applied to a dispensary, and also consulted several medical men of eminence. She states that some of her attendants informed her that she suffered from cancer of the rectum, others cancer of the womb, and a third party, that there was a tumour pressing upon, and obliterating the rectum. The treatment which had been adopted consisted chiefly in large doses of opium or its preparations to relieve pain, frequent enemata, sometimes purgatives, also opiates, suppositories.

June 11th. Met Messrs Whidborne and Storks in consultation at half-past nine o'clock A. M. Mr Storks having fully coincided in the opinion I had previously formed, viz. that there was at present no clear proof of scirrhus of the uterus, but that it was probable that the discharge, &c. resulted from propagated irritation, and, moreover, that in the present condition of parts it would be necessary to empty the rectum, even if scirrhus of the *cervix uteri* existed, proceeded to remove the load.

*Emptying of the Rectum.*—The patient, who was almost incapable of standing from weakness, was placed at the foot of the bed, with her legs on the ground, and the trunk of the body placed at right angles with the thighs, lying on the bed. By means of a lithotomy scoop and the finger, Mr Storks was enabled, with some difficulty, to remove portion after portion of the indurated mass, some of them lumps of about three inches in circumference, which had been placed transversely in the rectum, until the gut was emptied as far as could be felt. It was then washed out by a powerful stream of water from a syringe. The portions brought away were very considerable in quantity, and had distended the bowel to an enormous extent. These masses of fæces had a consistence like the firmest clay, and scarcely took the impression of the thumb when considerable force was employed, and were of a dark-brown colour. It required very considerable force to dislodge them from the rectum, so that the sphincter was slightly ruptured at its posterior part, whilst some of the larger masses were being forced through it. The patient complained a good deal during the operation.

Enemata, consisting of warm water and half an ounce of olive oil, were directed every four hours, and castor oil in doses of half an ounce, with five drops of the sedative solution of opium to be taken every three hours.

Eight o'clock P. M. The enemata had brought away a considerable quantity of dark-coloured fluid, feculent matter, with numerous hardened lumps, having a sacculated appearance, as if moulded in the cells of the colon. Countenance less anxious; patient free from pain; tongue moist and clean; pulse full, 100, and soft. Complains of much soreness of the abdomen and rectum. The abdomen is very intolerant of even slight pressure. A piece of flannel wrung out in hot water, and then moistened with purified oil of turpentine, was directed to be laid over the abdomen; to continue the castor oil and enemata.

June 12th. During the preceding night and this morning, the patient has passed five motions, consisting of liquid dark-brown fæces, with numerous hardened lumps of considerable size moulded in the sacculi of the colon. She has also vomited twice during the same time. The patient, who suffers very severely from the passing of these lumps, states that she counted forty which were passed in the five motions. Abdomen softer and less tumid, considerably more tolerant of pressure; tongue clean and moist; pulse full and soft, 70. To continue the castor oil every six hours.

13th. Has suffered severe pain in the hypogastric region, shooting to the upper part of the sternum, and along the course of the rectum, during the night and to-day. The pain she describes as "burning," being continual, but increased in paroxysms, when it assumes a stabbing character. During this sensation she has a desire to go to stool. She has gone to stool seven or eight times, but has voided fæces only three times; stools fluid and of a dark-brown colour, with very few lumps; there were none in the last. Has vomited several times to-day, and has retched violently, with severe agony in the belly from the effort. Abdomen very tender on pressure, especially the lower part. Tongue whitish, and rather dry down the centre; moist and clean at the tip and edges. Skin moist, soft, and warm; pulse 100, and soft. Complains of thirst, and states that she has several times become very chilly, followed by warm perspiration. Took a table-spoonful of brandy shortly before the commencement of these symptoms. She was directed to have half a drachm of laudanum with four ounces of water gruel as an injection immediately; eight leeches to the hypogastrium, followed by hot fomentations; and two grains of calomel, with one grain of opium every three hours, to the third dose. If the pain were not relieved in three hours, she was ordered to have hot oil of turpentine to be applied to the abdomen, as on a previous occasion. At eleven o'clock P. M. she was seen by Mr Whidborne's pupil, Mr Bean, who ordered a mustard poultice to the sacrum.

14th. The leeches, &c. had given slight relief, which, however, had not proved permanent. Enemata (used without direction) have brought away fluid fæcal matters. She has vomited several times, and continues to urge violently when sick. The matters vomited are of a yellowish colour, and an oily appearance. This morning, after taking a cup of coffee, she vomited about a pint of a brownish fluid, mixed with tenacious mucus, and containing a dark-brown, tolerably copious sediment, similar to coffee grounds. The coffee taken was not thick.

The patient makes continual and most urgent complaints of intolerable suffering in the abdomen, frequently increased by pain shooting up from the anus to about opposite the promontory of the sacrum, and attended with a desire to go to stool; but she does not pass anything unless injections are used. Her abdomen is intolerant of pressure, not so much so, however, as on the previous evening. Lips clean and moist; tongue slightly white down the centre, clean at the tip and edges, and moist; thirst not excessive; skin warm and moist; the feet, however, are cold; pulse, 100, and soft. Ordered two grains of calomel, with half a grain of opium every third hour; a blister to the abdomen; enemata to be omitted.

14th, Evening. Symptoms relieved. A poultice was directed to be applied to the anus.

15th. Countenance much less anxious; pain in the abdomen greatly diminished; no vomiting; still complains of pain in the rectum; tongue white down the centre, but moist. The bowels have been moved four times,—the two latter are very dark-coloured from the admixture of a large quantity of dark bile; pulse, 100, and soft; skin moist and warm. The blister has not risen well. Five pills have been taken since yesterday morning. To continue the pills; poultice to the anus.

16th. Complains of excessive pain, especially in paroxysms, in the site of the vagina and rectum. The external organs of generation are swelled, with ulceration of the mucous membrane around the entrance of the vagina, with a serous discharge. The uterus is situated low down, and its neck feels somewhat tumid and hot; but it is impossible to obtain a satisfactory examination of the organ, partly from the œdema of the parts, and partly from the excessive complaints and obstinate resistance of the patient. Pulse quiet; skin comfortable; tongue moist; abdominal pain and tenderness relieved; had vomited once or twice in the afternoon of the previous day; bowels moved several times; stools dark; has frequent desire to go to stool.

She was ordered half a drachm of laudanum with four ounces of water gruel as an injection *per anum* every four hours. A lotion of the dilute sugar of lead water to be kept applied to the vagina and external organs.

17th. Feels greatly relieved; abdomen not painful; no sickness; vagina and rectum give but little trouble; has had no evacuation from the bowels but what came away shortly after the use of the clyster; it is of a greenish colour. The expression of the countenance, also, is much improved; pulse quiet; skin comfortable; tongue clean and moist, whitish down the centre.

She was ordered to have immediately half an ounce of castor oil, to be repeated every six hours if the bowels are not freely opened; injections as before.

18th. Complains to-day of so severe a sense of bearing down, and of something coming away, that she cannot sit up even on the utensil, for which she feels a constant desire. This came on in the previous evening, with pain of a burning and shooting character occurring in paroxysms. Has had several stools of a healthy character without the oil; tongue moist and clean; pulse feeble, 100. The abdomen is rather distended with air, but quite tolerant of pressure. There has been no vomiting. Enemata (she states) occasion borborygmi and pain, and increase the bearing down. External organs less swelled; vagina ulcerated.

To take immediately half an ounce of castor oil, with twenty-five minims of laudanum. Poppy-head fomentation to the vulva.

19th. The pain is abated. The oil has operated several times, and vomiting has taken place twice. Vomited matters contain much viscid mucus. The spermaceti ointment to be spread on lint, and introduced into the vagina. Ten grains of compound ipecacuanha powder at night.

20th. Is comparatively free from pain, and has been so since yesterday. The condition of vulva and vagina as before, but no satisfactory examination of the condition of the uterus can be made. In other respects much better.

She was ordered to have half a drachm of sedative liquor of opium at night; lotion to be injected carefully into the vagina; ointment on lint to be used as before.

21st. Improved.

23d. Again complains of much burning pain in the rectum and vagina, with frequent desire to go to stool. The vagina and vulva are rather worse, with increased serous discharge. On going to stool, (which she says she has done about forty times within the last eighteen hours,) she brings away only very small quantities of soft feculent matter, with griping pains in the abdomen. Abdomen soft and not distended, and by no means intolerant of pressure. Pulse quiet and soft; tongue clean and moist; skin moist and warm. Ordered

℞ *Magnesiæ Sulph.* ℥i.; *Liq. Opii Sed.* ʒij.; *Aqua Menth. Piperitæ,* ℥viij. *M.* One ounce three times a-day.

℞ *Acid. Hydrocyan.* ʒii.; *Plumb. Acet.* x. gr.; *Aquæ,* ℥viij. *ft. lotio.* To be used for the vagina.

To continue the ointment, and to inject *per anum* two ounces of water gruel with half a drachm of sedative solution every four hours, till relief is obtained.

24th. Has been comparatively easy since she commenced the medicine. On taking which she brought off a considerable quantity of flatulence. Has had two full stools of fluid feculent matter of a healthy colour this morning, unattended by pain or tenesmus. In all respects much better. pt.

25th. Went to the Middlesex Hospital.

Mr Arnott has kindly favoured me with the subjoined account of her condition up to the 22d of August.

2 *New Burlington Street,*
*August* 22*d.*

Dear Sir,—I beg to apologise for not replying to your inquiries respecting Mrs Jones sooner. She was taken into the Middlesex Hospital on the allegation that she had *cancer uteri*, and when the inflammation of the vulva and vagina, with abrasion and ulceration of the inner surface of the labia under which she laboured, had partially subsided, examination *per vaginam* detected enlargement and induration of the *os uteri*, with copious warm offensive discharge from it.

Owing to the great pain attending their use, the patient reluctantly submitted to local application, so that the simple process of washing out the vagina was objected to and imperfectly performed, and the consequences have been, adhesions at the upper part of the vagina, rendering it impossible to examine satisfactorily the present state of the uterus *per vaginam.* But by the rectum, the uterus can be felt large and indurated, and from the vagina a very offensive discharge continues to flow. These symptoms, with the pain and cachectic state of the patient, lead to the conclusion that

she suffers from carcinoma of the womb.—I remain, DEAR SIR,
Yours truly, J. M. ARNOTT.

*Remarks.*—The case of Mrs Jones appeared to me of sufficient interest to bring under the notice of the Fellows of the Royal Medical and Chirurgical Society, illustrating, as it does, the effects of a prolonged suspension of the functions of the bowels. Cases, like the present, where there has been no proper evacuation of the alvine contents for three months, and a complete and entire suppression for a whole month, are doubtless rare. The extraordinary impaction of the rectum which resulted from this state of things—the induration of the accumulated fæces—and the satisfactory restoration of the alvine evacuations, *per vias naturales*, are worthy of consideration. It is somewhat remarkable that none of her medical attendants discovered the true cause of the retention of fæces; this, I believe, was mainly attributable to their making *per vaginam* examinations, and omitting to introduce the finger *per rectum*.

As regards the condition of the uterus, it was my impression on seeing the patient, and during the subsequent symptoms, that the extensive and prolonged accumulation of fæcal matters in the rectum was amply sufficient to account for the inflammation, ulceration and discharge from the vagina, and the tense and tender condition of the *cervix uteri*, the feel of which, on examination, appeared to me too regular and not sufficiently indurated (as far as could be made out) for scirrhus. But, supposing scirrhus to exist, which appears most probable from Mr Arnott's account, was it the primary affection, or was it induced in a predisposed individual from prolonged local irritation?

During the progress of the case there was a marked discrepancy between the excessive complaints of pain made by the patient, and the tranquil, satisfactory state of the constitutional symptoms, sufficiently so to raise a doubt of the entire truth of her statements.

There can, I should think, be no doubt of the propriety of emptying the rectum, notwithstanding the violence requisite to effect it; the subsequent symptoms sufficiently proving its value.

## ART. III.—*Case of Gun-shot Wound and Excision of the Head of the Humerus.* By THOMAS STRATTON, M. D., Edin. Licentiate, Royal College of Surgeons, Edinburgh; Member of the Toronto Medico-Chirurgical Society. In a Letter to Sir George Ballingall, M. D.

ON the 10th of August 1844, Xavier Hebinks, aged 6, one of Aissance's tribe of Chippawa Indians, living on Beau Soleil

Island,* Lake Huron, was out in a canoe, when a gun heavily loaded with duck-shot, and lying in the canoe, went off accidentally and wounded him in the left arm, he being at the time about six feet from its muzzle. The island is ten miles from Penetanguishene, and the weather being too stormy for a canoe, it was some days before they could bring him to me, when he was seen by Dr P. Nicolson, Hospital Staff, and Mr P. Darling from Manatoulin.

August 16. At first sight the wound appears to extend along the outer side of the arm from the shoulder to the elbow, but on re-applying a flap two inches long at its lower extremity, the wound is reduced to four and a half square inches. In the upper half of the arm the soft parts are much injured, part of them seems to have been shot away, and in the margin of the wound there are several shot-holes in the integuments; two inches of the shaft of the humerus is destroyed; there is a thin glairy discharge from the upper part of the wound; a part of the shaft of the humerus two inches long, and several other loose pieces of bone were removed, and also a quantity of moss which the Indians had applied to stop the bleeding, which they say was not great at the time of the accident. There is but little constitutional disturbance; the skin is cool, the tongue moist, and the appetite moderate. To take castor-oil, and a cloth dipt in cold water to be applied over the wound.

17. With the aid of Dr Nicolson I proceeded to remove the head of the humerus. The patient was laid on a table with his left shoulder projecting over its edge. Of the lower part of the humerus the projecting extremity had been broken very obliquely, and on bending the arm at the wound, this sharp and almost pointed end was removed, partly with a saw and then with the nippers. I then took hold of the lower extremity of the upper part of the humerus, and with a small double-edged scalpel cut along it upwards towards its head, from the side of which a small splinter was removed. The head was then turned out of the socket by using the scalpel around it and turning the other end towards the chest; the part thus removed measured two inches; no vessels required to be tied.* Search was made in the soft parts for any pieces of bone that might have been driven in by the shot; lint wet with water, was for the day put in the socket, the soft parts were adjusted so as to make the breach as small as possible; with a sling the elbow was raised up so as to aid nature in shortening the arm, in order that the loss of bone might be less felt; a single turn of a bandage confined the arm to the side, and a cloth dipt in cold water was applied over the wound. Not myself observing whether the patient cried much, I was told by the others that he stood the operation very well.

* Named also Prince William Henry and Pimetenagang.

August 18. Slept well; skin cool; bowels open; tongue moist; some thirst; the weather is hot, the thermometer being generally about 84° Fahrenheit in the shade; the lint is removed from the socket, and thin rags dipt in water are applied over the wound, which is five inches long, two and a half inches broad at its lower, and four and a half inches at its upper extremity. A number of maggots have appeared, on which account a solution of the chloride of lime, (half a drachm to a pint of water,) was applied to the wound.

August 19. He is proceeding favourably; very few maggots to-day; to continue to wet the cloths with the solution of the chloride of lime and with water alternately. To have a small quantity of Port twice a-day.

August 20. There is a copious thick yellowish discharge; no maggots to-day; slight cough. To wear flannel over the chest, and to avoid any unnecessary wetting when dropping the water over the wound. To use the solution of the chloride once a-day, and at other times to apply cold water to the wound.

August 30. He continues to go on well; no pain except when moved; the wound is smaller; the end of the remaining part of the humerus is now not visible nor is the glenoid cavity. Cloths dipt in a solution of the sulphate of zinc, (a few grains to one ounce of water,) to be applied to the wound.

September 17. It is a month since the operation. He sat up in bed to-day for the first time; there is great discharge; the wound is smaller; the forearm was bent and extended on the humerus once daily, and wrist-joint was exercised daily for a minute or two, to prevent stiffness from non-use.

September 18. A small piece of bone came away.

October 15. There escaped a second bit of bone an inch and a-quarter long.

October 17. The wound is now four inches long and an inch broad. He is out of bed, his arm in a sling, and continuing to use the sulphate of zinc solution.

October 23. There is discharged a third bit of bone two inches long; these pieces of bone are about a third of the cylinder of the humerus (longitudinally.)

October 30. The wine is discontinued.

November 17. The wound is now an inch and a-half long.

November 30. There escaped a fourth piece of bone an inch long; the wound is circular, and three-quarters of an inch in diameter.

December 7. The wound is now closed, 112 days after the operation. He moves the left elbow forwards and backwards as freely as before, and elevates it to within an inch as high as he can raise the right elbow; the left arm is about two and a half inches shorter than the right.

April 28, 1845. I saw Hebinks to-day. It is now eight months since the operation. He continues well, and has nearly as much use of the arm as before the accident. He uses the axe and lifts weights easily. He moves the left arm as freely in all directions as the right, except that he cannot elevate it quite so high. When he is dressed there is no observable difference between the arms; when undressed, the left shoulder appears flattened.

*Remarks.*—The soft parts were so much destroyed by the gun-shot injury, that the long period of three months and a-half was required for recovery. About four or six weeks of this delay was occasioned by the slow progress to the surface of fragments of bone which had been driven far into the soft parts. There was no use made of cataplasms or of unctuous dressings, the applications being of water alone, or with chloride of lime, or with sulphate of zinc, as a stimulant, as recommended by Mr Liston. It was unfavourable for such a large wound, that in August the weather was very hot, which encouraged the appearance of maggots, about two-thirds of an inch long. A few seen one day were followed on the next by hundreds; the rapidity of their production and growth is surprising. Perhaps they do not physically impede the cure; but, besides the loathsomeness of such creatures being about a wound and bed, they alarm a patient and his friends, and thus have a depressing effect on his mind. After they had been troublesome for a few days, chloride of lime was procured, and they disappeared.

The patient had slight cough for a few days; he occasionally had griping pain in the bowels, which may have been from the wine being of bad quality, and he suffered at times from cramp in the legs. The only internal medicine he took was an occasional dose of castor-oil. His diet was soup, made in the simple Indian manner, and bread, and as he was surrounded by his own people, his manner of living was the one he was accustomed to, and therefore that which in his peculiar circumstances was most advisable. The discharge being great, his strength required to be supported, and for the first ten weeks he had a small quantity of wine daily. Though rather more than one-third of the humerus was lost, nearly all the original power of the arm was retained. Not many years ago, it would have been thought that amputation at the shoulder-joint was the only admissible practice in such a case; but the limb has thus been preserved by that operation which owes to Professor Syme[*] its present position as one of the standard operations of surgery. A wild Indian, who lives by hunting and fishing, would have great difficulty in finding a livelihood if he had lost an arm; but in consequence of the relief afforded by this operation, Hebinks will be able to follow the usual Indian life.

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[*] On the Excision of Joints, in Edin. Med. and Surg. Journal, July 1828.

Though there is no precise manner of stating, in any case, the amount of constitutional disturbance after an accident or an operation, there appeared to be much less of this in this instance in the red man, than there would likely have been seen in a white. It is generally noticed that savage nations suffer less from wounds than civilised races. In Sir George Ballingall's Military Surgery, (1838) page 262, reference is made to recoveries in natives of New South Wales, from injuries which would have been almost certainly fatal to Europeans. While uncivilised races have thus less capacity* than the civilised for constitutional disturbance or sympathetic fever after injuries, wounds, and operations, a parallel fact is observed in their physiology; for it is said that an Indian woman is seldom more than a quarter of an hour in labour. If the process commences when on a journey, she leaves her companions, and soon overtakes them with her new-born infant. Rapid and easy parturition is also observed among the Esquimaux on both sides of Baffin's Bay, and it is interesting to observe that some of them who are now in a transition state from a savage to a civilised condition, are remarking† that labours are becoming more difficult and tedious.

*Penetanguishene, Canada,*
*June* 1845.

## ART. III.—*A Concise View of the Progress of Military Medical Literature in this Country; being a Chronological Arrangement of Authors, with Critical Remarks on their Works.* By JAMES IRVING, M. D. (Concluded from Vol. lxiv. p. 389.)

1818. Practical Observations on Fever, Dysentery, and Liver Complaints, as they occur amongst the European Troops in India: with Introductory Remarks on the Disadvantages of selecting Boys for Indian Military Service. By George Ballingall, M. D. Edinburgh, 8vo.

SIR GEORGE BALLINGALL, who informs us that these "Observations were chiefly written during the progress of a voyage from Madras to England," served as Assistant Surgeon to the 1st or Royal Regiment from 1806 to 1815, when he was promoted to the 33d Regiment. In the introductory remarks he expresses an opinion unfavourable to the enlisting of boys as recruits for regiments serving in India. "With the view," he states, "of bringing the foregoing reasoning to the test of experience, and of showing the description of men who are chiefly obnoxious to disease in India, I have formed a register of deaths in the regiment in which I had the honour to serve, and the results of this register exhibit a melancholy picture of premature decay." For a period of about six years and a half, the abstract of the register in question shows the monthly and annual number of men who died, distinguishing the numbers who died under 25, from those who died above 25 years of age. But unfortunately the comparative numbers of the two classes of men in the regiment are not stated, and it is therefore impossible to ascertain whether the proportion of mortality was greater under than above 25. It may be observed that in some infantry corps the mean age is not above 26 or 27 years. Young lads are certainly less able to undergo the fatigue of warlike operations than full grown men; but it has, I believe, been satisfactorily ascertained, that when they are not exposed to much physical exertion the proportion of mortality is invariably smaller among young than old soldiers. This result obtains in all climates where British troops are employed; and it would appear that the proportion of mortality increases in nearly an exact ratio with the age of individuals. Age has been found to be the chief regulator of the proportion of mortality among the indigenous inhabitants of all countries, nor does this law of nature appear to be suspended or interrupted among British troops serving in tropical climates. Annexed to the second edition is the author's Probationary Essay on Syphilis, which was published on his admission as a Fellow of the College of Surgeons.

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* Edin. Med. and Surg. Journ. April 1845, p. 334.

† Mr Lunberg's Letter to Mr Roberton, op. cit. January 1845, p. 61.

*Editions.*—Edin. 1818, 8vo. Edin. 1820, 8vo.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xv. p. 587.

1819. The Army Medical Officer's Manual upon Active Service: or, Precepts for his guidance in the various situations in which he may be placed, with Observations on the preservation of the health of Armies upon foreign service. By J. G. V. Millingen, M. D. London, 8vo.

This work presents us with the result of eighteen years experience in the service, during which time the author was present at twelve general engagements and fourteen partial actions. Dr Millingen offers advice to army medical officers in almost every situation in which they may be placed during active service, whether on a march, during a sea voyage, on disembarkation, in bivouac, in camp, in cantonments, in the field of battle, with a besieging or a besieged force, during a retreat, or in attendance on the sick in hospitals.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 436.

1819. Medical Topography of Upper Canada. By John Douglas. London, 8vo.

Mr Douglas was at this time assistant surgeon in the 8th regiment, and his work appears to have been written partly in Canada, when serving there during the time of the war, and partly after his return to Britain. It is divided into six sections or principal heads.

The first relates to the geographical features of the country. He afterwards treats in succession of the soil and climate; of the services of the troops; of the prevalent diseases; of the state of the wounded; and of the provincial militia, and Indian nations who co-operated with the army.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 566.

1819. Reports on the Epidemic Cholera which has raged throughout Hindostan and the Peninsula of India since August 1819. Published under the authority of Government. Bombay.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 458.

1819. A Sketch, analytical of the History and Cure of Contagious Fever. By Robert Jackson, M. D. London, 8vo.

Besides details as to the symptoms, diagnosis, morbid anatomy, and treatment of contagious fever, Dr Jackson presents us with a summary of the history of the disease as it occurred among the troops in various services in which he had been employed. In some spirited observations he particularizes the mode of recruiting the army, and of treating the soldiers, as principal causes of the introduction or spread of contagious fever.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 278.

1819. Observations on the Inflammatory Endemic incidental to Strangers in the West Indies from temperate climates, commonly called the Yellow Fever, as this disease occurred to the author during a public service of twenty years in a majority of the West Indian colonies: with notes and illustrations. To which is added an Appendix containing Abstracts of Official Reports upon West Indian Fevers, addressed to the head of the Army Medical Department. By Nodes Dickinson. London, 8vo.

1820. Practical Observations on the means of Preserving the Health of Soldiers in Camp and Quarters: with notes on the medical treatment of several of the most important diseases which were found to prevail in the British Army during the late war. By Edward Thornhill Luscombe, M. D.

Dr Luscombe details the result of sixteen years' experience, during twelve years of which he was surgeon to the 34th regiment. His observations were originally presented as an inaugural dissertation when he took the degree of M. D. at Edinburgh in the year 1817; and they relate to a variety of subjects connected with military hygiene, and the diseases of the Peninsular army.

*Editions.*—Edin. 1820, 8vo. Edin. 1821, 8vo.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 436.

1820. Principles of Military Surgery; comprising Observations on the Arrangement, Police, and Practice of Hospitals; and on the History, Treatment, and Anomalies of Variola and Syphilis. Illustrated with Cases, Dissections, and Engravings. By John Hennen, M. D. Edinburgh, 8vo.

This work, though appearing under a different title, may be considered as a second edition of the author's Observations published in 1818. But in the discussion of his former subjects, much new matter has been added; and observations are for the first time introduced on the examination of recruits, on feigned diseases, on topographical reports, on variola and vaccination, and on syphilis and its non-mercurial treatment.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xvi. p. 447.

1820. A Treatise on the Plague, designed to prove it contagious, from Facts collected during the Author's residence in Malta, when visited by that malady in 1813: with Observations on its Prevention, Character, and Treatment. To which is annexed an Appendix, containing Minutes of the author's evidence given before the Contagion Committee of the House of Commons, accompanied by their Report. By Sir Arthur Brooke Faulkner, M. D. London, 8vo.

1820. Report on the Epidemic Cholera Morbus, as it visited the Territories subject to the Presidency of Bengal in 1817, 1818, and 1819. Drawn up by order of Government under the superintendence of the Medical Board. By W. Jamieson, Ast.-Surgeon and Secretary to the Board. Calcutta, 8vo.

1821. Remarks on the Epidemic Yellow Fever which has appeared at intervals on the south Coasts of Spain since the year 1800. By Robert Jackson, M. D. London, 8vo.

We cannot fail to admire the ardour of Dr Jackson's zeal in investigating the nature and history of fever. He had at an early period become interested in this subject, and no opportunity was allowed to pass which might aid him in his search after truth. We hear of him in Flanders, in the West Indies, in America, in Great Britain, in Spain; but amid the vicissitudes of climate, and year after year, his thoughts are directed to the same object. So great indeed was his enthusiasm, that, only a few weeks before his death, when in the seventy-seventh year of his age, he conveyed to the Director-General an offer to waive his rank and proceed to Portugal, there to act under a junior, in order that he might enjoy a further opportunity of studying his favourite subject. Of the work under our present consideration, it has been said that it is the best of the many excellent publications of this well-known author. It contains observations on medical topography, on the question of foreign importation, on the nature, characters, and varieties of the yellow fever of Andalusia, on prognosis and treatment, and on the quarantine laws.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xix. p. 577.

1821. Notes on the Medical Topography of the Interior of Ceylon, and on the Health of the Troops employed in the Kandyan Provinces during the years 1815, 1816, 1817, 1818, 1819, and 1820; with brief Remarks on the prevailing Diseases. By Henry Marshall. London, 8vo.

Mr Marshall served in Ceylon from 1808 to 1821, and these Notes contain the result of observations made in the Kandyan or newly-acquired provinces during the last four years of that period. The chief design of the work, which was written at Kandy, is to give a brief sketch of the leading facts which came under the author's notice as senior medical officer of the district, in reference to the health of the troops. It is divided into three principal heads: 1. the medical topography of the interior of Ceylon; 2. on the health of the troops; 3. brief remarks on the prevailing diseases. The second part is interesting on account of its containing satisfactory returns of the fatal diseases, and the rate of mortality among the troops. The premises from which he drew his conclusions are carefully indicated; an essential requisite in all statistical documents of this denomination.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xviii. p. 295.

1821. The History of Plague, as it has lately appeared in the Islands of Malta, Gozo, Corfu, Cephalonia, &c., detailing important Facts illustrative of the Specific Contagion of that Disease, with Particulars of the Means adopted for its Eradication. By J. D. Tully, Surgeon to the Forces, late Inspector of Quarantine, and President of the Board of Health of the Ionian Islands. London, 8vo.

1822. A Manual of the Climate and Diseases of Tropical Countries; in which a practical view of the statistical pathology and of the history and treatment of those countries is attempted to be given; calculated chiefly as a guide to the young medical practitioner on his first resorting to those countries. By Colin Chisholm, M.D. London, 8vo.

Much of the matter to be found in this volume is contained in the second edition of Dr Chisholm's Essay on the Malignant Pestilential Fever, published in 1801. The manual is divided into three parts. The first relates to the statistical pathology of tropical countries, more especially of the West Indies. Here he points out the geographical and topographical features of tropical climates giving rise to disease, and the means of obviating their deleterious effects. The second part contains observations on several diseases prevalent in tropical countries, more especially in the West Indies; while the third part, which is on malignant pestilential fever, is an avowed republication from his essay on that disease.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xix. p. 129.

1823. Remarks on the Yellow Fever of the South and East Coasts of Spain; comprehending observations made on the spot, by actual survey of localities, and rigorous examination of fact at original sources of information. By Thomas O'Halloran, M. D. London, 8vo.

This work embodies the result of careful investigations made in the year 1821, during a short period of which Dr O'Halloran had leave of absence from Gibraltar, where he was in garrison with the 64th regiment as assistant-surgeon. He had also served in Great Britain, in America, and in the West Indies, and in the latter station had witnessed the yellow fever. His researches are chiefly directed to the two questions of the contagious origin and peculiar pathological character of the disease. He contends for its non-contagious nature, and with the view of more firmly establishing his opinion, gives the result of laborious investigations into the topography of Barcelona, Puerto de Santa Maria, Tortosa, Malaga, Xerez de la Frontera, Lebrixa, and Cadiz; and next adverts to the origin of the disease in each of those places. Having diligently examined the bodies of those who died, he is enabled to speak with some degree of confidence in reference to the pathology of yellow fever.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xix. p. 577.

1824. Report on the Epidemic Cholera as it has appeared in the Territories subject to the Presidency of Fort St George. Drawn up by order of Government under the superintendence of the Medical Board. By William Scott, Surgeon, and Secretary to the Board. Madras, fol.

1825. Observations on the Cholera Morbus of India; A Letter addressed to the Honourable the Court of Directors of the East India Company. By Whitelaw Ainslie, M. D. London, 8vo.

1825. Sketches of the most prevalent Diseases of India; comprising a Treatise on the Epidemic Cholera of the East; Statistical and Topographical Reports of the Diseases of the different divisions of the Army under the Madras Presidency; embracing also the annual Rate of Mortality, &c., practical Observations on the effects of Calomel, on the Alimentary Canal, and on the Diseases most prevalent in India. Also an Inquiry into Chronic Inflammations and Abscess of the Liver. By James Annesley. London, 8vo.

The greater part of this volume is occupied with an account of the history and treatment of cholera. The reports and tables in the second part were drawn up or copied from returns published by the Medical Board of Madras, and contain information regarding the climate and diseases of different stations and districts, the treatment of diseases, and the rate of mortality.

*Editions.*—Lond. 1825, 8vo. Lond. 1829, 8vo.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xxv. p. 168.

1827. Notes on Epidemic Cholera. By R. H. Kennedy, Surgeon, H. E. I. C. S Calcutta, 8vo.

1827. Observations on the Fever of Seringapatam. By William Geddes, H. E. I. C. S. Madras, 8vo.

1828. A Series of Reports, exhibiting the Result of Disease in the different European Regiments serving under the Madras Presidency, and in the Garrison Hospital of Madras and Poonamalee. Madras.

1828. Hints to Young Medical Officers of the Army on the Examination of Recruits, and respecting the Feigned Disabilities of Soldiers; with Official Documents, and the Regulations for the Inspection of Conscripts for the French and Prussian Armies. By Henry Marshall. London, 8vo.

This valuable work effectually supplied an important desideratum in the medico-military literature of Britain. We are to consider it as a practical commentary on the circular from the Army Medical Department, dated 1st June 1824, and entitled, "Rules to be observed on the Examination of a Recruit." These rules form the subject of observations intended to point out the particular circumstances disqualifying men for the service, the modes employed by recruits to hide defects or traces of disease, and the method of detection. A large portion of the work is occupied with the important subject of feigned diseases, which are so often brought forward by soldiers as a reason for obtaining their discharge; and we find numerous cases illustrating the modes of feigning and the manner of detection. The official documents here published commence at the year 1815, and consist of circulars, general orders, and letters from the adjutant-general, the secretary at war, and the medical board, in reference to the enlisting of soldiers.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xxx. p. 172.

1828. Researches into the Causes, Nature, and Treatment of the more prevalent Diseases of India, and of warm Climates generally: illustrated with cases, *post mortem* examinations, and numerous coloured engravings of morbid structures. By James Annesley. London, 2 vols. 4to.

This splendid work is the result of the greater part of thirty-seven years' experience in various parts of India. Mr Annesley aims at giving "to the medical officers of India a manual, as it were, of the diseases which he may have to combat in the course of his practice, and to point out to him the various forms and varieties under which they appear, and the mode of treatment which has been found to be attended with the greatest success." With this view, he gives some account of the climate and medical topography of Bengal, Bombay, and Madras, but more particularly the latter, in which he was president of the medical board; and then enters at very considerable length into an account of the history and treatment of the prevailing diseases. He also introduces some short observations on the means of preserving health, and of managing European troops on their arrival in India. The morbid appearances are beautifully illustrated by means of forty coloured plates, from drawings of dissections made in the country. From the second edition we learn that this work is attached as a regimental record to every regiment in India.

*Editions.*—London, 1828, 2 vols. 4to. London, 1841, 8vo. This second edition is considerably abridged.

*Reviewed.*—Brit. and For. Med. Review, vol. xiii. p. 347.

1828. Observations on the Nature and Treatment of Cholera, and on the Pathology of Mucous Membranes. By Alexander Christie, Surgeon H. E. I. C. S. Edinburgh, 8vo.

1830. Introductory Lectures to a Course of Military Surgery, delivered in the University of Edinburgh. By George Ballingall, M. D. Edinburgh, 8vo.

These five lectures contain what we must consider as the most important part of Sir George Ballingall's course; that part, namely, which relates to military hygiène. The first lecture contains historical notices of the writers on gunshot wounds; the second relates to the diet, clothing, and exercise of troops; the third to the accommodation of troops in camp, in barracks, and in billets; the fourth to the site, construction, and ventilation, and to the economy and discipline of military hospitals; while, in the fifth lecture, we find observations on the means of transporting the sick and wounded of armies. As an appendix, there is a "Bibliographical List of Writers on the Diseases of Soldiers and Seamen, on those of Foreign Climates, on Wounds, and other branches of Military Surgery."

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xxxiv. p. 412.

1830. Sketches of the Medical Topography of the Mediterranean: comprising an account of Gibraltar, the Ionian Islands, and Malta; to which is prefixed a Sketch of a Plan for Memoirs on Medical Topography. By John Hennen, M. D. Edited by his son, J. Hennen, M. D. London, 8vo.

These sketches were originally drawn up in the form of Reports to the Director-General of the Army Medical Department, by Dr Hennen, as Inspector of Hospitals in the Mediterranean station, and they embody the result of the author's experience, with compilations from official documents transmitted to him by inferior medical officers. The work contains an account of Gibraltar, Malta, and each of the Ionian Islands, with the exception of Paxo and Cerigo; and supplies much valuable information, arranged according to the method proposed in his "Sketch of a Plan for Memoirs on Medical Topography," which was first published in the sixty-seventh volume of this Journal, and is here reprinted.

1830. Official Papers on the Medical Statistics and Topography of Malacca and Prince of Wales Island, and on the prevailing Diseases of the Tenasserim Coast. By T. M. Ward, M. D., and J. P. Grant. Penang, fol.

These papers are of the following denomination:—1. Contributions to the Medical Topography of Malacca. 2. On Phagedenic Ulcer and other diseases among the native troops at Malacca in 1827-8. 3. Contributions to the Topography of Prince of Wales Island. 4. Observations on Fever and other diseases among Europeans at Penang. 5. Observations on the Ulcers which prevailed among the native troops at Rangoon, Prome, Savoy, and Prince of Wales Island from the year 1825 to 1829; and observations on Fever. Of these papers, the first three are by Dr Ward, the other two by Mr Grant.

1830. An Account of the Convalescent Station at Malcolm Pait on the Mahabaleshwar Hills. By J. Walker, M. D., H. E. I. C. S. Bombay, 8vo.

1831. Medical Reports: containing Observations on Cholera, Dysentery, the effects of Sulphate of Quinine as a remedy of Fever; and on Inflammation of Veins: with Cases of these diseases, and Notices relative to the treatment of Syphilis without Mercury, and the utility of an Indian remedy in Ophthalmia. Selected by the Medical Board from the Records of their Office, and published under the sanction of Government. Madras, 8vo.

This volume contains many valuable practical observations on the different subjects mentioned in the title, and by various medical officers belonging to the East India Company's Service. The Reports were originally sent to the Medical Board, and the grounds which induced the Board to publish these particular papers were, the importance of the subjects discussed, "and the effect they appear calculated to produce in advancing professional research by exhibiting the results of different remedial agents in particular diseases, and their application in different situations and circumstances."

1831. An Essay on the Epidemic Cholera of India. By Reginald Orton, Surgeon, H. E. I. C. S. London, 8vo.

1831. The History of Contagious Cholera; with facts explanatory of its origin and laws; and a rational method of Cure. By James Kennedy, Surgeon, H. E. I. C. S. London, 12mo.

1831. Cholera; its Nature, Causes, Treatment, and Prevention, clearly and concisely explained. By Charles Searle, Surgeon, H. E. I. C. S. London, 8vo.

1832. A Treatise on the Epidemic Cholera, as it prevailed in

India; together with the Reports of Medical Officers. By Fredrick Corbyn, Surgeon H. E. I. C. S. Calcutta, 8vo.

1832. On the Epidemic Cholera, and other Diseases of India. By Samuel Dickson, Assistant-Surgeon, Royals. Edinburgh, 12mo.

1832. Observations on some important points connected with the Treatment of Cholera Asphyxia. By James Hutchison. Calcutta, 8vo.

1832. Clinical Illustrations of the more important Diseases of Bengal: with an Inquiry into their Pathology and Treatment. By William Twining. Calcutta, 8vo.

Mr Twining records the general result of his practical experience at the General Hospital of Calcutta, in which he was First Assistant Surgeon. The work is divided into five chapters; of which the first relates to Dysentery; the second to Diseases of the Liver; the third to Diseases of the Spleen; the fourth to Cholera, and the fifth to Fevers. The object of the work is "to add to our knowledge of these diseases by a diligent observation of the phenomena attendant on their origin, progress and termination; with the strictest attention to the effects of the several remedies employed; and, in fatal cases, by a careful *post mortem* examination of the ulterior changes that are produced by disease." Histories of 147 cases are given, illustrative of the doctrines and practice of the author.

*Editions.*—Calcutta, 1832, 8vo. Calcutta, 1835, 2 vols. 8vo.

*Reviewed.*—Brit. and For. Med. Review, vol. iii. p. 329.

1832. On the Enlisting, the Discharging, and the Pensioning of Soldiers: with Official Documents on these branches of Military Duty. By Henry Marshall. London, 8vo.

The object of this admirable treatise will be best explained in the words of the author. "I have endeavoured to give a practical commentary on the regulations which have been issued in regard to the duty of examining recruits and the discharging of disabled soldiers; and in the execution of this design my principal aim has been to explain the practice of carrying the rules into effect, not to argue their policy or to suggest reforms—to narrate rather than to discuss." Mr Marshall has long devoted his attention to this subject, and had enjoyed ample opportunities for acquiring a practical knowledge of it, both as regimental and staff surgeon. In 1826 he published "Practical Observations regarding the Inspection of Recruits for the Army, including some remarks on Feigned Diseases; being the substance of a Paper transmitted to the Army Medical Department;" and in 1828 appeared his Hints to Young Medical Officers. The present work contains the result of more ample experience and reflection. It consists of three parts; the first on the Enlisting of Soldiers; the second on Discharging, and the third on Pensioning. The value of the work is much enhanced by the addition of several tables and returns, which have been most carefully prepared, and contain much interesting information.

*Editions.*—Edin. 1832, 8vo. 1839, 8vo.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. xxxviii. p. 136. Brit. and For. Med. Review, vol. xviii. p. 117.

1833. Outlines of the Course of Lectures on Military Surgery delivered in the University of Edinburgh. By Sir George Ballingall, M. D. Edinburgh, 8vo.

This work is intended to serve as a text-book for the students of military surgery in the University of Edinburgh, and as a manual for the army-surgeon. The author is the first who in this country has delivered a separate and systematic course of lectures on this branch of medicine; and his work contains much instructive information derived from his own experience, as well as the experience of others. The numerous topics discussed are arranged into three parts, of which the first embraces the consideration of numerous subjects connected with the formation, discipline, and economy of an army; such as the selection and examination of recruits, diet, exercise and clothing of troops; billets, camps, and barracks; the transport of sick, &c. The second part relates to the diseases most prevalent among troops and fleets, and contains observations on inflammation, burns, ulcers, wounds, fractures, luxations, amputation, ophthalmia, venereal diseases, diseases of the rectum and anus, and lastly, on punishments. The subject of wounds is discussed at great length, and under several heads; thus, according to the nature of the wound, as incised, punctured, poisoned, lacerated and contused, gunshot; according to the part wounded, as wounds of the arteries and nerves—of the head, spine, face and neck, thorax, abdomen, and extremities; in addition to which we find remarks on aneurism and tetanus. The third is an interesting part, and relates to the diseases of troops on foreign stations. Here we find a short account of the distribution of the British Army, and the stations in which it serves;—with observations on yellow fever, dysentery, liver disease, beriberi, rheumatism, and burning of the feet, and dracunculus or Guinea worm; with a few remarks on feigned and factitious diseases, and their mode of detection. In conclusion is a list of writers on subjects connected with the health of soldiers and seamen.

*Editions.*—Edin. 1833, 8vo. 1838, 8vo. 1844, 8vo.

*Reviewed.*—Edinburgh Medical and Surgical Journal, vol. xl. p. 438.

1834. On the appearance of Cholera at Sunderland in 1831; with some account of that Disease. By James B. Kell, Surgeon, 82d Regiment. Edinburgh, 8vo.

1835. A Practical Essay on the History and Treatment of Beriberi. By John Grant Malcolmson. Madras, 8vo.

In May 1832 the Madras Medical Board offered two prizes of

L.50 each for the best essays, the one on Beriberi, and the other on Rheumatism and its sequel Burning of the Feet, two obscure diseases very prevalent among the native troops of India. Mr Malcolmson, notwithstanding his other occupations as assistant-surgeon, prepared dissertations on each of these subjects, to which the prizes were awarded. When we consider the short time he had to collect materials, we cannot but be surprised at the number of facts, statistical and pathological, here brought forward. He describes the disease; makes some remarks on its prevalence in the north division of the Madras presidency between 1827 and 1830; discusses its pathology; and lastly, speaks of the treatment.

*Reviewed.*—British and Foreign Medical Review, vol. v. p. 116.

1835. Observations on some Forms of Rheumatism prevailing in India. By G. J. Malcolmson. Madras, 8vo.

This work contains matter relative to the pathology and treatment of rheumatism among the natives of India, to its sequel, burning in the feet, and to rheumatism among Europeans in India.

*Reviewed.*—Brit. and For. Med. Review, vol. v. p. 116.

1835. A Treatise on the Functional and Structural Changes of the Liver in the Progress of Disease; and on the Agency of Hepatic Derangement in producing other Disorders: with numerous cases, exhibiting the Invasion, Symptoms, Progress, and Treatment of Hepatic Disease in India. By W. E. E. Conwell, H. E. I. C. S. London, 8vo.

*Reviewed.*—Brit. and For. Med. Review, vol. iii. p. 329.

1837. Notes on the Medical Topography of Calcutta. By James Ranald Martin. Printed by order of Government. Calcutta, 8vo.

Mr Martin was Presidency surgeon and surgeon to the native hospital. His notes, besides presenting us with full information in reference to the topography of Calcutta, contain observations on climate, on the treatment of fever, dysentery, and liver disease, on change of locality as a remedial measure, on the prevention of disease, on the habits of soldiers, and their influence on health, on the term of efficient service in India, and on several other topics. In a tabular view he exhibits the methods of treatment recommended by different authors in dysentery and in fever; from which we may learn the folly of trusting to any exclusive system of treatment, and the necessity of forming a cautious and liberal judgment of those whose practice differs from our own; since from this table we find that eminent physicians of extensive experience have recommended very opposite practice. We also see the "necessity of becoming acquainted with every attending circumstance before we venture to censure any particular practice."*

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* It is not a little remarkable, as is shown in this book, that in remittent fever the proportion of deaths is no greater in "cases where the 'medicine expectante' was

1837. A Letter to the Right Honourable Sir Henry Hardinge, K. C. B., M. P., on the Effects of Solitary Confinement on the Health of Soldiers in Warm Climates. By John Grant Malcolmson, H. E. I. C. S. Lond. 8vo.

Mr Malcolmson endeavours to show that solitary confinement, with restricted diet, is a more severe punishment than flogging, and that it has a direct tendency to impair the mental and bodily powers. He concludes by remarking, that " sufficient food and exercise must be allowed to the prisoner if it be intended that he should afterwards be of use to himself, his family, or country."

*Reviewed.*—Brit. and For. Med. Review, vol. iv. p. 191.

1838. Report on the Sickness, Mortality, and Invaliding among the Troops serving in the West Indies.

1839. Reports in regard to the Troops serving in the United Kingdom, the Mediterranean, and British America.

1840. Reports in regard to the Troops serving in Western Africa, St Helena, the Cape of Good Hope, and the Mauritius.

1841. Reports in regard to the Troops serving in Ceylon, the Tenasserim Provinces, and the Burmese Empire.

The object of the various reports above enumerated is to give an account of the sickness, mortality, and invaliding among the troops for a period of twenty years, or from 1817 till 1836. The reports of the troops serving in the Australian colonies and in the three presidencies of India, are said to be in a state of preparation.

" These reports, which have been so admirably drawn up by Mr Marshall, Deputy-Inspector-General of Hospitals, Major Tulloch, and Dr Balfour, are invaluable, and do infinite credit to the judgment and discrimination of Lord Howick, late Secretary at War, who first duly appreciated their importance to medical science, and to Sir James M'Grigor, who, with the able assistance of Dr Theodore Gordon, planned the annual reports and topographical statements on which the statistical reports are founded. These annual reports, which are highly creditable to the medical officers of the army, were first projected by Sir James M'Grigor on his being placed at the head of the medical department in 1815, and have been kept up on a uniform plan since 1816." (Sir James Clark on Climate, 3d edition, p. 6.)

*Reviewed.*—Brit. and For. Med. Review, vol. viii. p. 211 ; ix. p. 63 ; xi. p. 364 ; xv. p. 1.

1838. Clinical Lectures on Compound Fractures of the Extremities ; on Excision of the Head of the Thigh Bone, the Arm Bone, and the Elbow Joint ; on the Diseases of the Pe-

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the order of the day," than in those treated with " all the activity and all the orthodoxy of the schools."—P. 125.

ninsula; and on several miscellaneous subjects: delivered at Westminster Hospital. By G. J. Guthrie. London, 8vo, pp. 64.

These lectures were gratuitously delivered to medical officers of the various branches of the public service, together with those embracing the whole range of surgery. Mr Guthrie had followed this practice for twenty-two years; and on ceasing to lecture he strongly recommended Government to take into consideration the propriety of forming schools for the training of young medical men destined for the public service, and which would also be of use in renewing the knowledge of medical officers who might have been for some time on foreign service. The lectures are seven in number, and embrace a variety of interesting subjects connected with surgery and military hygiene.

1839. A Letter to the Right Honourable the Secretary at War, on Sickness and Mortality in the West Indies: being a Review of Captain Tulloch's Statistical Report. By Sir Andrew Halliday, M. D., Dep.-Inspect.-Gen. of Army Hosp. London.

*Reviewed.*—Brit. and For. Med. Review, vol. viii. p. 211.

1839. On the Topography of Meerutt; and the principal Diseases which prevailed in the First Brigade of Horse Artillery at that place. By John Murray, M. D. Printed by order of Government. Calcutta, 8vo.

Dr Murray here furnishes short notes on the general topography of Meerutt, one of the most ancient cities of India, and situate in the Bengal presidency. But the greater portion of his pamphlet is occupied with observations on the health of the Meerutt Division of Artillery, from the 1st of January 1833 to the 1st of June 1837.

1839. Notes on the Medical Topography of the District of Sarun. By Robert Rankin. Printed by order of Government. Calcutta, 8vo.

1839. Outlines of the Topography and Statistics of the Southern Districts of Oud'h, and of the Cantonment of Sultanpur-oud'h. By Donald Butter, M.D. Printed by order of Government. Calcutta, 8vo.

1840. General and Medical Topography of Kalee Kemaoon and Shore Valley: with Sketches of the Cantonments of Lohooghaut and Petoragurh; as also of the Roads, Rivers, Bangalows, &c. of part of the District. By William Dollard. Printed by order of Government. Calcutta, 8vo.

1840. A Sketch of the Topography and Statistics of Dacca. By James Taylor. Printed by order of Government. Calcutta, 8vo.

This is a very full and laborious report of the topography of Dacca, a district situate in the eastern part of Bengal. Mr Taylor discusses the aspect of the country, the climate, productions, manufactures, and resources, commerce, revenue, population, manners, &c. of the people, diseases, state of the hospitals, &c. He evinces considerable learning and acquaintance with the subject, and has collected much interesting information.

1840. A Practical Essay on some of the principal Surgical Diseases of India. By F. H. Brett. Calcutta, 8vo.

Mr Brett belongs to the Bengal Medical Service, and was surgeon to the Governor-general's body-guard. The work is divided into seven chapters, which treat in succession of inflammation and its sequelæ; parasitic growths; Indian leprosy; diseases of the urinary and generative organs; diseases of the eye; autoplastic operations, and dracunculus.

*Reviewed.*—Brit. and For. Med. Review, vol. xii. p. 422.

1840. Thesis on the Nature and History of Plague as observed in the North Provinces of India in the years 1815–21, and 1836–38; to which are added Remarks on Plague and Quarantine Laws. By Frederick Forbes, M.D., H.E.I.C.S. Edinburgh, 8vo.

1841. Some Account of the General and Medical Topography of Ajmeer. By R. H. Irvine, M. D. Calcutta, 8vo.

1843. Report on the Medical Topography and Statistics of the Southern Division of the Madras Army. Compiled from the Records of the Medical Board Office. Published by order of Government. Madras, 8vo.

This Report contains notices of the medical topography and statistics of Salem, Coimbatore, Paulghautcherry, Travancore, Cochin, Quilon, Tinnevelly, Palamcollah, Madura, Dindigul, Ramnad, Rammisseram, Tanjore, Combaconum, Negapatam, and Tricinoply. The notices in most instances are short, and intended to explain the situation, resources, climate, and productions of the district, and the degree of health enjoyed by the inhabitants and troops, with an enumeration of the prevalent diseases among the natives, among the troops, and in the jails. Illustrative of these points, various tables and numerical statements are added.

1843. Practical Observations on the principal Diseases affecting the Health of the European and Native Soldiers in the North-Western Provinces of India: with a Supplement on Dysentery. By W. L. Macgregor, M. D. Calcutta, 8vo.

*Reviewed.*—Edin. Med. and Surg. Journ. vol. lxiii. p. 497.

1843. Remarks on Schools for Military and Naval Surgeons: in a Letter to the Right Hon. Sir Robert Peel, Bart. By Sir George Ballingall, M. D. Edinburgh, 8vo.

In this letter Sir George Ballingall points out the inadequate provision made in this country, compared with others, for the education of surgeons for the public service; the propriety and advantages of attending more to this subject; and in conclusion, a proposal is made for the endowment of a Professorship of Military Medicine and Surgery in London and another in Dublin.

1844. Report on the Medical Topography and Statistics of the Provinces of Malabar and Canara. Compiled from the Records of the Medical Board Office. Published by order of Government. Madras, 8vo.

The above Report contains observations on the topography of Cannanore, Tellicherry, Calicut, and Mangalore, with tables of the diseases in the jails of those places, tables of diseases, and rate of mortality among the native and European troops, return of persons vaccinated, &c.

1844. Report on the Medical Topography and Statistics of the Mysore Division of the Madras Army. Compiled from the Records of the Medical Board Office. Published by authority of Government. Madras, 8vo.

This report refers to the medical topography and statistics of the districts of Bangalore, Chittledroog, and Nuggur, the town of Mysore, the vicinity and cantonment of Bangalore: the cantonment of Hurrghar and French Rocks; Hoonsoor and Remont Depôt. It also contains tables of the diseases and mortality among European and native troops, and among officers, women, and children, with a return of persons vaccinated.

In conclusion, it only remains for me to acknowledge the debt of gratitude which I owe to Mr Marshall, Deputy-Inspector General of Hospitals, at whose suggestion this paper was undertaken, and without whose most friendly guidance the writer must, in many cases, have pursued his course with little confidence as to the solidity of the ground on which he was treading.

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## ART. IV.—*On the Pathological Effects of Atmospheres vitiated by Carbonic Acid Gas, and by a diminution of the due proportion of Oxygen.* By JOHN SNOW, M. D., London.

THE greater part of the experiments contained in the following paper were related to the Westminster Medical Society on March 30, 1839, and a very brief report of them appeared in the Medical Gazette and the Lancet at the time; but, as the subject to which they relate is of great importance, I have thought it desirable that these experiments should be placed in detail before the profession, and accompanied with some explanations.

There are on record a great number of cases of gradual or slow asphyxia from atmospheric air contaminated with carbonic acid gas, but the circumstances under which these accidents occur are always such as to preclude the possibility of analysing the air producing them. The greatest difference of opinion has existed amongst authors, not only with respect to the amount of deterioration which is fatal or dangerous, but also as to whether carbonic acid is an active poison, or is merely injurious by displacing the atmospheric air; and although the experiments of Collard de Martigny show, in my opinion, the active nature of carbonic acid, they do not show the quantity necessary to produce injury or death; and I know of no experiments on animals, except those I am about to relate, which are calculated to point out the condition of an atmosphere which may or may not be fatal to persons breathing it.

When there is more carbonic acid in the air than the fraction naturally present, there will always be a diminution of the due proportion of oxygen; but this diminution will vary very much with the manner in which the carbonic acid has been produced: if it has been given off from a fermenting vat, or separated from lime or any body with which it was in combination, it becomes added to the air, mixing with it and displacing the nitrogen and oxygen alike. In this case the diminution of the oxygen is equal to twenty-one hundreths of the carbonic acid gas present, or about one-fifth. But if the carbonic acid is the result of the breathing of a number of persons in a limited portion of air, or of the combustion of charcoal or other matter in it, then the carbonic acid gas being formed by union of carbon with the oxygen of the air, the diminution of the oxygen in a given bulk will be always equal to, and in many cases somewhat greater than the amount of carbonic acid present. As an illustration of the above difference in the constitution of the air, I may here remark that a small wax taper is instantly extinguished in air which has been contaminated by respiration till it contains 4 per cent. of carbonic acid, whereas 20 parts carbonic acid, or 25 parts nitrogen, require to be added to 100 parts of common air before it will extinguish the flame.

In order to investigate this subject properly, I sought to determine separately the effects of carbonic acid and of a diminished amount of oxygen; and the quantity of air used, in proportion to the size of the animals experimented on, was so great that the result could not be vitiated by the products of their respiration during the experiments.

## First Division.—*Experiments undertaken to determine the effects of diminishing the amount of oxygen.*

*First Experiment.*—Into a large glass vessel, containing 2000 cubic inches of atmospheric air, inverted over water, 70 cubic inches of nitric oxide gas were passed, which, combining with part of the oxygen of the air, formed nitrous and nitric acids, which were absorbed by the water. After the entire absorption of these acids, and the volume of the air had been restored to 2000 cubic inches, the composition of this factitious atmosphere was found to be 18½ oxygen, 81½ nitrogen in every 100 parts, the oxygen being reduced 2½ per cent. Into this a white mouse was introduced, and the small quantity of carbonic acid given off from its lungs was absorbed by lime water. It seemed unaffected, and was taken out at the end of five hours.

*Second Experiment.*—A sparrow was placed in a factitious atmosphere similar to the last, and at the end of five hours was breathing laboriously. Being left for the night, after seven hours longer, it was found dead.

*Third Experiment.*—Into the same vessel 100 cubic inches of nitric acid gas were passed, and an atmosphere was thus formed, in which the oxygen was diminished 3½ per cent., being composed of 17½ per cent. oxygen, and 82½ per cent. nitrogen. In this a white mouse was placed for ten hours, but seemed unaffected, and was taken out at the end of that time uninjured, and remained well.

*Fourth Experiment.*—A sparrow placed in an atmosphere similarly constituted was taken out at the end of half an hour unaffected, and it continued well.

*Fifth Experiment.*—The last experiment was repeated with another sparrow, which was allowed to remain. After a time its breathing became laborious, and it died at the end of six hours. Its blood remained fluid after death, and that in the lungs was of a florid colour. In this, as in all this division of experiments, the small quantity of carbonic acid gas given off from the lungs of the animal was absorbed by lime water.

*Sixth Experiment.*—In the same vessel and by the same method 6 per cent. of the oxygen were removed, leaving 15 per cent. oxygen and 85 per cent. nitrogen. A sparrow put into this atmosphere opened its bill and became convulsed at the end of 35 minutes. It was now taken out, but never completely recovered. It died in the course of the following night, and its lungs were found to be soft and gorged with dark fluid blood.

*Seventh Experiment.*—A white mouse was placed in a similar atmosphere, and at the end of five hours and three quarters it was insensible, breathing deeply, but very seldom. It was now taken out, and it soon recovered.

*Eighth Experiment.*—A green linnet was placed in an atmosphere containing 1 per cent. more oxygen than the last, viz. 16, 5 per cent. only having been abstracted; and it died in ten minutes.

*Ninth Experiment.*—Half of the oxygen having been removed, and the volume restored as before, an atmosphere was formed consisting of 10½ per cent. oxygen and 89½ per cent. nitrogen. A white mouse was introduced into this, and it became immediately distressed, breathing deeply and quickly. In five minutes itwas nearly exhausted, being no longer able to stand, and evidently on the point of death. It was now taken out, and very soon recovered.

### SECOND DIVISION.—*To show the effects of carbonic acid gas, the due amount of oxygen being preserved.*

*Tenth Experiment.*—Eighty cubic inches of carbonic acid gas and twenty cubic inches of oxygen were passed into the same large vessel, placed over a saturated solution of common salt, and it was filled up with atmospheric air. It then contained a factitious atmosphere constituted as follows,—

| | |
|---|---|
| Oxygen, | 21 |
| Carbonic acid, | 4 |
| Nitrogen, | 75 |
| | 100 |

A linnet was placed in this for eleven hours; it was dull and listless during the experiment, and its respiration was rather deeper than natural; otherwise it was unaffected, and it resumed its usual vivacity directly after the fresh air was admitted to its cage.

*Eleventh Experiment.*—240 cubic inches of carbonic acid, 60 of oxygen, and 1700 of atmospheric air being mixed, an atmosphere was formed containing

21 oxygen,
12 carbonic acid, and
67 nitrogen,

in every 100 parts.

A small bird was put in, and its respiration became quicker, deeper, and difficult in less than an hour, and it appeared very uneasy at the end of two hours and a half. When it was left for the night it was in the same state. In the morning it was dead; its limbs were rigid, and the blood in the heart and adjoining large vessels and in the lungs was fluid and dark coloured.

*Twelfth Experiment.*—An atmosphere being formed of the following composition,

21 oxygen,
20 carbonic acid,
59 nitrogen.

100

Two birds were put into it. They became greatly disturbed almost immediately, and were taken out at the end of a few minutes, but died shortly afterwards. Their feathers, however, got wetted whilst they were being withdrawn, which would diminish their chance of recovery.

*Thirteenth Experiment.*—A white mouse was placed in a similar atmosphere. Its respiration became hurried, it became feeble, and died at the end of an hour and a half.

### THIRD DIVISION.—*In which there is carbonic acid, with a diminished amount of oxygen.*

*a.* In which the oxygen is diminished only by about one-fifth the amount of the carbonic acid gas present, as in cases where the air is vitiated by a fermenting vat or by a lime kiln.

*Fourteenth Experiment.*—Six per cent. of carbonic acid were put into the same large vessel, the remaining 94 being atmospheric air; the oxygen was consequently diminished from 21 to very nearly 19¾ per cent. Two brown linnets were put into this atmosphere, and they immediately began to breathe deeply, and in ten minutes they opened their bills. They continued to breathe laboriously for four hours and a half, when one of them died. The other one was then taken out, and it commenced to breathe naturally directly afterwards, and remained well till employed in another experiment. The blood of the one that died was of a cherry red colour.

*Fifteenth Experiment.*—A white mouse was put into the vessel whilst containing 10 per cent. carbonic acid, and 90 common air; the oxygen being thus diminished by two per cent. very nearly. The mouse was distressed and breathed deeply from the commencement, and at the end of three hours was removed in a very feeble state, but it recovered directly.

*b.* In which the diminution of oxygen equals or exceeds the amount of the carbonic acid gas present, as in cases in which the air is vitiated by respiration, by the combustion of charcoal, or by artificial lights.

*Sixteenth Experiment.*—A factitious atmosphere was formed, containing 1½ per cent. of carbonic acid, and in which the oxygen was diminished by 2 per cent. It was consequently constituted as follows.

| | |
|---|---|
| 1.5 | carbonic acid |
| 19.0 | oxygen |
| 79.5 | nitrogen. |
| 100 | |

A linnet was placed in this and allowed to remain for twelve hours. It was not particularly affected during the experiment, and it remained in good health after its removal.

*Seventeenth Experiment.*—A candle was allowed to burn in the large glass filled with atmospheric air, till on the point of going out. It was removed before the evolution of those poisonous gases which arise from the slow combustion of the tallow in the wick after the flame is extinguished. Consequently, the products of combustion were some carbonic acid and vapour of water, and the composition of the vitiated atmosphere was found to be

3.00 carbonic acid
16.75 oxygen
80.25 nitrogen
———
100

The air had, therefore, lost 4¼ per cent. of oxygen, and acquired 3 per cent. of carbonic acid very nearly.

A brown linnet was put into this; it began to breathe deeper than natural, and died in 2½ hours.

*Eighteenth Experiment.*—A wax taper having burnt till it went out for want of sufficient oxygen the remaining air was found to be composed as follows.

3 carbonic acid
16.5 oxygen
80.5 nitrogen
———
100

It had consequently lost 4½ per cent. of oxygen, and acquired 3 per cent. of carbonic acid. A white mouse, introduced into this atmosphere, was uneasy from the first, endeavoured to find its way out, breathed laboriously, and after four hours was lying on its side, exhausted and scarcely breathing. It was withdrawn, and recovered after a while.

In this class of birds, the respiratory function is in its highest perfection: the developement of animal heat, and the necessity for a constant supply of fresh air are greater than in the rest of the animal kingdom. In the mouse, the respiratory function and the developement of caloric are rather low. Contrary to the habit of the small song birds, who live always in the open air, it lives naturally in holes, where the air will necessarily be somewhat vitiated by its own respiration. Accordingly we find that the birds were uniformly sooner distressed and killed than the mice by corresponding atmospheres. The human being, as regards his respiratory function, is placed between the bird and the rodent, and we may therefore conclude that the fatal effects of vitiated atmospheres on him will likewise be intermediate. It must follow, then, that 5 or 6 per cent. of carbonic acid cannot exist in the air without danger to life, and that less than half this amount will soon be fatal, when it is formed at the expense of the oxygen of the air, as it is in most cases of accident and suicide.

Whilst these experiments clearly establish the fatal effects of carbonic acid, they disprove some of the arguments from which this gas has hitherto been concluded to be poisonous. It has been said that the illness following exposure to its effects, in cases where the patient was discovered before death, showed its poisonous nature; but in the sixth experiment we have illness and subsequent death after removal from an atmosphere deteriorated by removal of part of its oxygen, whilst no carbonic acid was present; and the chance of recovery after these experiments seemed to depend on the extent and duration of the previous suffering, rather than on the presence or absence of carbonic acid.

It has been argued, that the blood being found florid in the body, was a proof that there was sufficient oxygen in the air, and that, hence, death resulted solely from the carbonic acid. But, in the fifth experiment, the blood in the lungs was florid, when none of this gas was present, and death arose from an insufficiency of oxygen—an insufficiency to maintain life, yet enough to redden the blood.

Carbonic acid gas caused deep and laborious breathing, but in what way it was destructive to life, these experiments do not enable us to state. Its injurious effects seem to depend rather on its physical properties, viz. its density and solubility in the blood, than on any strictly poisonous qualities; and this view is supported by Nysten's experiments of injecting it into the blood-vessels. He sums up the result of his experiments as follows: "Le gas acide carbonique injecté dans le systéme veineux en quantité considérable, mais avec les précautions nécessaires pour ne pas occasionner la distension du cœur pulmonaire, ne donne lieu à d'autre phénomène consécutif notable qu'une foiblesse musculaire qui cesse au bout de quelques jours."*

The experiment of Collard de Martigny, in which he was immersed in the gas without breathing it, might seem opposed to this view; but it is to be observed, that he breathed through a long tube, which process, by obliging him to respire part of the same air over and over again, would sufficiently account for all the symptoms he experienced.

The appearances after death in the experiments recorded in this paper were somewhat various, and seemed to depend, rather on the slowness or quickness of dying, than on the constitution of the air causing death. There was no appreciable congestion or other morbid appearance in the brains of those animals which died. Apoplexy has occasionally occurred to human beings under similar circumstances; but the brain of man is a much more complex organ than that of the bird and rodent. Many of these birds sweat profusely during the experiments, breathing laboriously, and placed, as they were, in an atmosphere saturated with moisture.

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* Recherches de Physiologie et de Chimie Pathologiques, p. 93.

Naturalists tell us that birds do not perspire; the fact, however, is otherwise; but, under natural circumstances, the perspiration passes off insensibly in the form of vapour, on account of the high temperature of their bodies.

These experiments agree with some points which have been observed in accidents to human beings. For instance, a contaminated atmosphere has been known to prove fatal, though it produced no inconvenience at first. Now, in the majority of these experiments, the animals were apparently not affected till after a longer or shorter time. It has been observed, that air contaminated with carbonic acid may be dangerous, although a candle will continue to burn in it, and such was the state of the air in the fourteenth and fifteenth experiments.

Professor Graham suggested a plan, which has been published in the reports of the Royal Humane Society, of absorbing the carbonic acid gas remaining after the explosion of fire-damp in coal mines, by means of inhaling the air through a cushion filled with a mixture of slaked lime and pounded sulphate of soda. But we have seen that the carbonic acid is not the only cause of injury; and since, from the constitution of fire-damp, the loss of oxygen by its explosion will, in every instance, be at least twice as great as the carbonic acid which is added, this ingenious contrivance could remove but a small part of the vitiation, and, by giving a false idea of security, would be likely to increase, instead of diminishing accidents.

Professor Graham evidently partakes of an error, which, I believe, is pretty general in the profession, viz. that the whole, or nearly the whole, of the oxygen of the air is available for respiration. He says, "In many cases the oxygen of the air is not exhausted by the explosion, although, from the presence of 5 or 10 per cent. of carbonic acid, it is rendered irrespirable." Now, if but 5 per cent. of carbonic acid were present after the explosion, half the oxygen of the air would be gone, and the other half would not support life for five minutes; consequently, after the absorption of the carbonic acid, the residual air would be instantly fatal.

The amount of oxygen cannot be reduced by any notable amount without danger. I mean the amount in proportion to the nitrogen; for the amount in a given space may be greatly reduced, provided the nitrogen be reduced *pari passu*, since, on high mountains, persons suffer only a little inconvenience, when the quantity of oxygen in a given space is reduced below what would be quickly fatal, and what would admit of the combustion of no ordinary materials, if the full amount of nitrogen were present.

54, *Frith Street, Soho Square.*

## Art. V.—*Continuation of Historical and Critical Remarks on the Operations for Cataract.* By Alexander Watson, M. D., F. R. S. E., Consulting Surgeon to the Royal Infirmary, Senior Surgeon to the Edinburgh Eye Infirmary, &c. &c.

### ON THE OPERATIONS BY DISPLACEMENT AND SOLUTION, INCLUDING DEPRESSION, RECLINATION, AND DIVISION OF THE CATARACT.

### § 1. *Historical Remarks.*

The disease termed Cataract had been early observed to affect the human race. This we learn from the earliest medical writings extant. And although the exact nature and seat of the disease were not then understood, remedies of different kinds were employed for its cure. These consisted of external applications and internal remedies, which we now know can be of no avail in removing the disease; and, therefore, when they appeared, in ancient times, to have been administered, in some cases, with success, it is probable that they had been used in different diseases which resembled and had been mistaken for, or were confounded with, cataract.

The want of general success, however, in the use of these means to cure the disease, must have caused attempts to remove it by operation, at length to have been resorted to; and this probably at an early period; for the established maxim was,

> "Quod medicamenta non sanant, ferrum sanat."[*]
> "Quodsi inveteraverit cataracta, manu curandum est."[†]

Accordingly we find a description of this disease given by Celsus,[‡] and a particular account of the operations then performed for its removal.

The operations described by Celsus, as at that time currently practised, consisted in the displacement and depression of the opaque body from the axis of vision, within the eye, by means of a needle introduced through its coats. When this depression of the cataract proved unsuccessful, by its rising again and resuming its former position, it was divided into several parts, which were, by farther manipulation, concealed in the eye, and the cure was thus completed.

These are the first operations for cataract of which there is any authentic account upon record; and we recognise in them a close resemblance to the operations by displacement and solution of the present day. But since the days of Celsus, the nature of the disease has become more perfectly understood, and great improvements have been made in the operations for its cure.

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[*] Hippocrates. [†] Celsus, vi. 35. [‡] Lib. vi. et vii. An. D. 7.

The Arabians, as well as the Greeks, seem to have been acquainted with the operations necessary for the removal of cataract. The Persian surgeon, Ali Ben Abbas,* and the Spanish Arabian Abu'l Kasem,† speak of the removal of the opaque body both by extraction through the cornea and by depression within the eye. But the latter appears to have preferred depression as more easy in performance; and we further find that while Abenzoar thought extraction impossible, Isa Ben Ali, celebrated as an oculist, after describing the manner of performing extraction, allows that it is more easily described than accomplished.‡

The great evil by which the Arabian surgeons appear to have been beset, was their erroneous notion on the nature of the disorder. As upon looking at the eye they observed an opaque, roundish, or globular body, they imagined that this was a drop of a peculiar character, opaque and dense, and therefore impenetrable to light, which had fallen into the eye. They named the disease, therefore, the opaque drop, (*gutta opaca.*) Then, when they found that this was not the sole cause of blindness or obscurity of vision, but that patients came to them with the eye apparently clear, they imagined that a drop was still the cause of the blindness, but that the drop in this case was clear, or transparent, not cloudy, and hence they termed the disease the clear or serene drop, (*gutta serena.*) This term has thus been adopted from the Arabians, and applied by surgeons to the Amaurosis of the Greeks.

The surgeons who flourished in the middle ages and about the period of the revival of literature, borrowed most of their scientific information and practical rules from their Arabian predecessors; and as Roman literature became more general, they added a little from the Roman surgeons subsequent to Celsus. It appears further, that while surgery was mostly in the hands of the servants of the clergy, various laymen practised a method of extraction by exsuction, which made Guy de Chauliac reject this method of operation, because by it the humours unavoidably escaped.§

At this time the ideas of surgeons on the nature of the disease seem to have still partaken of the errors of the Arabians. They imagined that the blindness was produced either by the opaque drop, or a sort of film or pellicle or thin membrane, interposed behind the pupil. It was the middle of the seventeenth century, viz. 1651, before these ideas were rectified.

This ignorance, however, did not prevent many persons from operating; but the operation appears to have been entirely empirical, and very often unsuccessful.

It is a very remarkable circumstance also, that, in Eastern countries, where medical science was quite unknown, an operation for cataract, by displacement within the eye, has long been practised by native operators with considerable success, and who have handed down to posterity, by hereditary tradition, their mode of operating.*

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* Aly Abbas Practic., Lib. ix. c. 28. f. 163. Venetiis, 1492.

† Albucasis, Chirurg., Lib. ii. sect. 28, p. 168.

‡ Jesus de Oculis, f. 17, *b.* Venetiis, 1506.

§ Guid. Cauliac Doctr., Li. tr. 6, 2 c.

The removal of cataract by the operations described by Celsus continued to be practised throughout Europe, gradually advancing and becoming improved with the progress of civilisation. The study of anatomy and the accurate knowledge of the structure of the eye, gave surgeons more just notions on the nature of the disease, and the most probable method of removal. But it also rendered them timid. And the result was, that the operation was very frequently practised by itinerant oculists or eye-doctors, who were for the most part very ignorant of the true structure of the eye. It was the habit of these men to boast much of their success. But it seems now very doubtful whether they had any good reason to do so.

Leopold Dieteric Gosky, in a dissertation published in 1695 at Frankfort on the Oder, relates that, about twelve months previously, one of these itinerant eye-doctors, when he presented himself to the president to be examined, boasted that he had a needle by which he could easily extract the cataract, and that it was sent him from Riga by an old friend, who had used it successfully. A few months before, however, another quack had declared himself the inventor of this needle, and accused the other of acting perfidiously towards him.†

It was only about the middle of the seventeenth century that the true nature of cataract was discovered; and Gassendi informs us that Remi Lasnier, a surgeon of Paris, was the first person who maintained, that cataract depends on opacity of the crystalline lens, and not on the presence of a pellicle or membrane. It does not appear, however, that Lasnier had proved his hypothesis by anatomical facts; and this was done only about the end of the century by Pierre Brisseau, a physician of Tournay and Douay, who, after performing the operation on dead bodies, found, on examining the eye, that the disease depends on opacity of the crystalline lens.

It was afterwards suspected by De la Hire that in certain cases of cataract the opacity was seated in the capsule; and the justice of this was demonstrated by Morgagni.

Towards the end of the seventeenth century, viz. in 1694 and afterwards, it appears that John Henry Freytag, surgeon in Zurich, had practised successfully the operation of extraction; and he had become convinced from the testimony of ocular observation, that the disease is often the result of an opaque membrane surrounding the crystalline lens.*

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* Journal of Science and the Arts, No. III; also Asiatic Magazine and Review, July 1818, and Transactions of the Medical and Physical Society of Calcutta, vol. ii.

† De Cataracta Dissertatio Medico-Chirurgica, quam Praeside Albino, defendit, L. G. Gosky. Francofurti ad Viadr., 1695. Haller Disput. Select. Vol. ii. p. 47.

But even up to the beginning of the eighteenth century, the opinions of the most eminent medical authorities do not seem to have been settled upon this subject. For we find Banister in 1622 defining cataract to be " a heape of superfluous humours made thicke, like to a little skinne betweene the horny membrane and the crystalline humour directly upon the apple of the eye, swimming above the waterish humour in that place which Celsus affirmeth to be void and empty. Fernelius appointeth the place of it between the *membrana uvea* and the crystalline humour."† He also asserts that cataracts in children are incurable.

Purmannus, the learned and distinguished surgeon of Breslaw, states, " The *cataracta suffusio*, or *gutta serena*, as it is called, is a skin growing invariably on the pupil of the eye, which it covers by degrees, and grows all over the *tunica uvea*, that the patient cannot see through it." He further states, that a viscous matter, or *spissatio humoris aquei* is the true cause of cataract.‡

The works of St Yves, Fabricius, Heister, Dionis, Petit, and others, might here be quoted to the same purport, that the true nature of cataract was at that time but imperfectly understood, and was confounded with other diseases of the eye. Hence, as might be expected, this was the subject of controversy for a long series of years.

In 1740 Sharp defines cataract to be " a disease of the crystalline humour, rendering the whole body of it opaque." But he also mentions the difference of opinion which then existed on the subject.§

Although a difference of opinion had hitherto existed as to the nature and seat of the disease, the same operations for its cure continued to be practised from the time of the Greeks and Arabians down to the middle of the eighteenth century, when the operation by extraction was adopted, as another mode of curing cataract. Since that period modern industry, skill, and ingenuity, have been successfully exerted in advancing the more accurate knowledge of this subject, which has been acquired. So that these have not only given precision to our knowledge of the nature and seat of the disease, to the diagnosis, and to the proper adaptation of operations to different cases, but also to the best modes of operating; circumstances which, in former ages, were very imperfectly understood.

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* Dissertatio quam, praeside D. J. Boecler, defendet J. H. Freytag, Argentorati, 1721. Haller, Disput. Select. Chirurg. T. ii.

† See Banister on 113 diseases of the Eyes and Eyelids. London, 1622.

‡ See Chirurgia Curiosa, Trans. Lond. 1706.

§ Sharp's Operations of Surgery. London, 1740.

While the operations by displacement and division, as described by Celsus, continued to be practised, special attention was not directed to the solution and absorption of cataracts by the agency of the humours of the eye, till a very late period. Our distinguished countryman Pott[*] seems to have been the first who applied his talents and opportunities of experience to this subject. He ascertained distinctly the fact of the solven agency of the aqueous and vitreous humours upon the lens; and the beautiful process of nature by which the lens, when its capsule is freely opened, is removed from the eye. Much advantage has since been taken of this in the treatment of cataract; and hence the operation by solution. By the improvements made upon this operation by the further experience of Saunders, Scarpa, Conradi, Beer, Buchhorn,[†] Jaeger,[‡] Langenbeck, and others, the operation by division and solution of the opaque lens, when soft, became adopted by the profession, as one of the established regular operations for the cure of cataract.

## § 2. *Of the success of the operations by Displacement and Solution.*

*a. Depression and Reclination.*—The antiquity and long-continued practice of the operation for cataract, by displacement within the eye, form strong presumptive evidence of the success of this mode of operating. Nothing could be more surprising and delightful to a patient than the sudden restoration of his sight by an operation which gave him little trouble or inconvenience. But in former times, as well as now, this happy consummation was not always the result. The demerits and occasional unfortunate termination of the operation were observed in all times of its progress. Celsus observed that the cataract often rose again to its original position after it had been depressed; and subsequent observers remarked that the depressed cataract often acted as a foreign body in the eye, which, by the irritation it occasioned, gradually produced blindness. The evils most usually resulting in this way are secondary cataract, the *Nachstarr* of the Germans, and *Iritis*.[§] These have been made the subject of a learned dissertation by Schmidt, Professor of Medicine at the Medico-Chirurgical Academy at Vienna.

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[*] Surgical works. London.

[†] De Keratonyxide nova Cataractæ aliisque oculorum morbis medendi methodo chirurgica, disserit. Guelielmus Henricus Julius Buchhorn, M. C. D. Magdeburgi, 1810, 4to.

[‡] Dissertatio de Keratonyxidis usu quam disquisitioni publicae submittit Fredericus Jaegerus Kirchbergensis M. et Ch. D. Viennae, 1812.

[§] Ueber Nachstaar und Iritis nach Staaroperationen. Von D. Joh. Ad. Schmidt. Wien, 1801.

These inconveniences still continue occasionally to be felt, and the possibility of their occurrence is inherent and inseparable from the operation. It is, therefore, not uncommon to see a patient in whom a cataract was successfully couched, afterwards attacked with inflammation of his eye, which no remedies can arrest before vision is destroyed. Indeed, when the displaced lens either rises again and presses upon the iris, or afterwards causes destructive inflammation of the internal parts of the eye, no state of the organ could be more painful or hopeless.

In many cases, however, this operation is performed with little or no inconvenience to the patient, is unattended with inflammation, and is followed with complete success,—circumstances which recommend its adoption in cases of old infirm patients, and in those cases, where the state of the eye in other respects, may render the prospect of success, by any other operation, very uncertain.

The operation of depression is much more easily performed than that of extraction, so that while extraction is only performed by those who make it a particular study, depression is attempted by all. This circumstance is probably one cause of a lower average of success than might otherwise attend it.

Some very eminent operators, however, even in our own times, as Scarpa, Dupuytren, and Jungken, have confined themselves almost exclusively to this mode of curing cataract, from having found it much more successful, in their hands, than that of extraction. But this may be said to have arisen chiefly, if not entirely, from themselves, rather than from the nature of the operation; because, it may be said, that they had failed to overcome the difficulty (formerly noticed) attending the operation of extraction. Hence, the most impartial opinion upon this subject, is to be obtained from those, who practise each of the operations, according as they are adapted to the nature of individual cases.

Although I have witnessed the operations of many of the most celebrated operators in Europe, and might remark upon them, I shall not presume to criticise them individually; my object being rather to take a general and comprehensive view of the subject.

The conclusion I have come to concerning this operation, therefore, is, that, when carefully and properly performed, in suitable cases, it is a very important and generally successful operation. It is not an operation which ought to supersede extraction, when this can be equally well executed. But there are many cases and circumstances which render extraction inadmissible, where displacement may be performed with success.

*b. Solution and Absorption.*—The operations now practised for the removal of soft cataracts, by dividing them into pieces with a needle, in order to effect their solution and absorption within the eye, are probably the most successful operations for the cure of cataract. This success is owing to the operations now under consideration being more easily performed than either extraction or depression; and also to the more favourable nature of the cases to which they are best adapted, (being those of young subjects), as well as to the circumstance of their occasioning less injury to the eye in their performance. They are, therefore, well calculated to supersede the other modes of operating, in a very great proportion of cases, and with every prospect of success.

### § 3. *Of the performance of the Operations by Displacement, and Solution.*

*a. Instruments.*—The only instrument required for performing these operations is a needle, or small sharp penetrating instrument with a convenient handle.

The displacement or division of a cataract with the needle may seem to be a very simple and insignificant operation. Hence, many attempt these operations without success. They may be performed, and even successfully, by many, but few do them well.

These operations require to be performed very methodically in all their stages; and this is the more necessary to be attended to, that some of the parts concerned in the operation (the capsule of the lens and hyaloid membrane) are commonly transparent and invisible to the operator. Inattention to, or ignorance of this, are the causes of many failures.

Needles of various forms have been employed for these operations. Their size has been different; some being extremely small, others of a considerable magnitude. Their points have been different in form; some have been round, with a sharp point, others flat and spear-pointed, with cutting edges; some have the point straight, while others have different degrees of curvature, approaching to a hook. In short, every distinguished operator would seem to have fashioned needles for himself, and advocated their superiority above all others.

When we consider the various different operations now performed with these instruments, it is not surprising, that various different forms of needles have been devised to accomplish the special objects in view;—whether for depressing, reclining, opening the capsule, cutting or breaking to pieces the opaque lens, separating adhesions of the iris, or removing membranous cataracts. For accomplishing each of these different objects, operators adopt peculiarities in the size, form, and point of the needles, to which they give a preference from their conceptions of superior suitableness.

The more simple the form of the needle is, however, the better; and the operator, by custom and habit, soon finds it best to adhere as much as possible to the same forms of instruments; because he wields these with more precision and dexterity than those to which he is less accustomed.

In the progress of the operations now under consideration, the inventors or improvers of them have generally recommended a peculiar needle for their performance. Hence such needles have been afterwards known by their names. It would lead me too much into detail to enter minutely into the different modifications of the needles alluded to. But from the original works which are now before me, I shall endeavour to make a selection of those most deserving of notice.

The needle of Celsus (Fig. 1 of Plate) and the ancients is now merely a matter of history; that of the native Indians, (Fig. 2), though curious, is clumsy and useless to the surgeon; while those of all the older operators have been superseded by modifications of the needles of Scarpa, (Fig. 3), Beer, (Fig. 4), Langenbeck, (Fig. 5), and Walther, (Fig. 6).

The general properties which all good needles ought to possess are, 1st, that it be from an inch to an inch and a-half in length; 2d, having a fine slender stem tapering slightly towards the point; 3d, possessing sufficient strength not to break, the thickness being so proportioned to the size of the point that it does not allow the escape of the humours when introduced; 4th, the steel is to be well tempered, the point nicely set, and the edges cutting but not too broad—the point should not bend; 5th, immediately behind the point or shoulders, the stem of the needle should be quite round, in order that it may be turned upon its axis, when the point is introduced through the coats of the eye. Needles for operating on infants or children, are generally made of a smaller size than those for adults.

*b. Mode of Operating by Displacement.*—The complete displacement of the lens, or *depression*, (Fig. 10, *c*), was long the established operation for cataract; but it is very probable that, in many cases, the result of the operation consisted only in its partial depression, or that now termed *reclination*, (Fig. 10, *b*). This last mode of displacing the lens was first practised and recommended as an improvement on couching, by Willberg in 1785, and afterwards by Beer.

Both of these operations were usually performed, by introducing the needle through the coats of the eye posterior to the iris. But Jacques Guillemeau (in 1598) proposed the introduction of the needle through the cornea.* This mode of operating has been called *keratonyxis*, and was revived by Conradi and Beer in 1797. This was followed by Langenbeck and Buchhorn at the beginning of the present century, who recommended it, both in the operations for displacement and solution.

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* Ammon, p. 30.

These different modes of operating have their advantages and disadvantages; but, in practice, it will be found that, by introducing the needle through the coats of the eye behind the iris, the operator has much more command of the lens and can displace it with much greater facility, than when the needle is introduced through the cornea. If he is desirous merely to open the anterior part of the capsule, to expose the lens to the action of the aqueous humour, the anterior operation, or keratonyxis, may be sufficient.

In performing any of these operations, the choice of a needle must depend on the object which the operator has in view. If he propose to depress or recline the lens, in the usual manner, a needle is to be selected which is capable of penetrating through the coats of the eye with facility, from its sharp point and cutting edges,—of opening the capsule with facility,—and of depressing the lens without passing into its substance, by having a flat or broad point. The form of the needle must also be such, as not to become entangled with the lens, so as to raise it from its depressed position in withdrawing it from the eye, by being too much curved. But if the object is to divide the lens for solution, or remove a membranous cataract, a curved needle with a cutting point will be found to answer best. If the object is to open the anterior part of the capsule and break up the substance of the lens through the cornea, the needle of Langenbeck is most suitable.

Keeping in view, as the great object to be accomplished in the operation of depression, that the lens is to be lodged in a breach of the vitreous humour, below the axis of vision, with as little disturbance to the parts connected with it as possible; let us consider the effect that is produced by the operation performed, according to the usual directions given upon the subject. The mode generally recommended is, after introducing the needle through the coats of the eye, that the point of it is to be brought forward between the iris and lens,—laid upon the upper part of its anterior surface,—and the lens is then to be pressed down, below the margin of the iris and into the vitreous humour, out of the axis of vision.* Now, in order to depress the lens in the vitreous humour, by this operation, it must be pushed forcibly through the posterior part of its capsule and hyaloid membrane. But from the size and form of the lens, and the strength of these membranes, in place of forcing a passage for itself through these, the lens generally drags them downwards, and displaces the hyaloid membrane from the ciliary processes, (see Fig. 11.); thus producing extensive and serious injury to several most important and delicate parts within the eye.† Besides this, the lens almost always rises up again, from the elasticity of the parts and their disposition to resume their former situation; and, if the anterior part of the capsule has been opened, the lens gets in contact with the posterior surface of the iris, and causes great pain and inflammation, generally followed by the disorganization of the eye.

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* See Celsus, Sharp, Scarpa, Beer, Guthrie, Travers, Lawrence, Mackenzie, &c.

† Where the hyaloid membrane is disorganised, the lens falls down whenever it is touched with the needle. But these are very rare cases.

These consequences may be obviated by an operation somewhat novel, which I shall now describe.

From what has been said above, it forms an important object in this operation, to disengage the lens from its capsule before depressing it. This must be done very carefully and methodically, by making an incision in its posterior part, through which the lens is to be pushed into a breach made in the vitreous humour, not by forcibly pressing the lens against the membranes, but by the needle.

To accomplish this, I introduce the small cataract bistoury (Fig. 7,) through the coats of the eye, about a line and a-half from the margin of the cornea. It then penetrates into the vitreous humour, and is made to form a breach in it, at the proper place for the reception of the lens when depressed. The point of the instrument directed forwards to the lens, is then to be pushed across the eye to the opposite or nasal side of the lens. (Fig. 12.) When it has reached this situation, the point is to penetrate the posterior part of the capsule, and, by drawing it outwards, made to incise it across at its middle, from the nasal to the temporal margin. This being effected, the point of the needle is to be pushed forward between the lens and the iris, (Fig. 13,) its flat side placed on the lower part of the lens, and made to press it backwards and upwards, so that its lower margin may pass backwards through the opening made in the posterior part of the capsule; by then shifting the point of the needle forwards upon the lens, it is gradually pressed backwards and downwards into the breach of the vitreous humour, from whence it never rises. (Fig. 10, *c.*) Thus we accomplish by previously cutting with the needle, what has been generally recommended to be done by forcible pressure upon the lens. Little or no inflammation follows this operation.

If, in this operation, the anterior part of the capsule of the lens remains entire, it is so far well, as the humours in the different chambers of the eye are thus prevented from incorporating, which lessens the risk of subsequent inflammation. If the capsule afterwards becomes opaque, it can be easily removed by a subsequent operation.

In performing this operation, considerable dexterity of management is required for opening the capsule, disengaging the lens, and depressing it into the vitreous humour; and as the capsules, being generally transparent, are invisible, each of the different steps of the operation requires to be methodically executed. The same mode of operating answers for reclination.

If, contrary to expectation, the lens is found to be soft, it may be broken to pieces, and these, or some of them, depressed into the vitreous humour where they will dissolve.

*b. Mode of operating by Division of Lens.*—The object of this operation should be to get the opaque lens dissolved by the aqueous humour, without injury to the hyaloid membrane of the vitreous humour. It is well suited to all cases of cataract in young subjects, whether from injury or spontaneous. This, like displacement, may be done either by keratonyxis, or by introducing the needle through the sclerotica behind the iris. In the division of the capsule and lens with the needle, too much should not be attempted at once; but the object accomplished rather by repeated operations, when the cataract is pretty firm. The first operation may consist in the division of the anterior parts of the capsule and lens by two crucial incisions, by means of Langenbeck's needle, made sharp on its convex edge. After a few weeks, the lens has been so acted on that, on introducing a curved cutting needle (see Fig. 9,) the cataract will be found very soft, easily broken into detached pieces, and removed into the anterior chamber, for the more free exposure of it to the action of the aqueous humour, by which it is dissolved, and then removed by the absorption and renewal of that fluid.

Several other important topics I find still remain to be commented upon, viz. the comparative merits of the operations,—the state of the patient,—and the time most favourable for performing them; but these I am under the necessity of delaying for the present.

## *Explanation of Plate.*

Fig. 1. The couching needle of Celsus.

Fig. 2. The needle or probe used by the native Indians for depressing the lens, after an opening has been made through the coats of the eye for its introduction.

Fig. 3. Side view of the couching needle of Scarpa. 3 *a*, the front view.

Fig. 4. The straight needle of Barth, Beer, Langenbeck, &c.

Fig. 5. Curved needle, sharp on both its edges, used at Vienna for opening the capsule in performing extraction. It might also be used for the operations by solution.

Fig. 6. Curved needle, being a modification of Scarpa's, used for depression by Himly, Walther, Langenbeck, Buchhorn, Jungken, &c. *a*, side view of the same.

Fig. 7. Needle, having its point formed like a small bistoury, sharp on its concave edge, invented by Ritterich of Leipsic, for dividing the iris in closure of the pupil, and operations for cataract. The small projection at *a* shows the operator the distance to which it is introduced into the eye.

Fig. 8. Small straight needle for operating on infants. Curved needles may be made of the same size.

Fig. 9. Small curved needle about the size recommended by Adams and Jacob.

Fig. 10. Perpendicular section of the eye, showing the situation of the lens in its natural position, and when displaced. *a*, the situation of the lens; *b*, its position after reclination; *c*, its position after depression.

**Fig. 11.** Diagram, showing the manner in which the hyaloid membrane is torn from the ciliary circle, by the forcible depression of the lens without opening its capsule.

**Fig. 12.** Horizontal section of the eye, showing the position of the needle when introduced to divide the posterior part of the capsule of the lens.

**Fig. 13.** The same with the needle brought forward between the iris and lens to depress it.

**Fig. 14.** The posterior part of the anterior half of the eye, showing the opening in the capsule through which the lens has been depressed.

**Fig. 15.** Ivory hook, or speculum for opening the eye-lids. I find this to answer the purpose better than the metallic instruments in common use.

## ART. VII.—*Observations on Pulmonary Apoplexy proving fatal by rupture of the periphery of the Lung, and effusion of Blood into the Pleura.* By ROBERT PATERSON, M. D., F. R. C. P. E., &c., Physician to the Leith Dispensary, Casualty Hospital, &c.

EFFUSIONS of blood into the cavity of the pleura are of by no means common occurrence. They arise, however, from two sets of causes. External injury and internal lesions. Those occurring from external injury have their origin in fractured ribs with wounds of the lung, and in punctured and gunshot wounds of the chest, including some artery or vein.

Those arising, again, from internal lesions have various origins. The rupture of an aneurism into the pleural cavity, the tearing or rupture of a trunk carrying arterial blood in false membrane, the effusion of bloody fluid from the pleura itself, (these two having received the appellation of sanguineous empyema, or hæmorrhagic pleurisy,) and, lastly, apoplectic effusion into the tissue of the lung, rupturing that tissue and its pleural investment, and pouring out blood into the pleural cavity, have all been found to be causes of bloody effusion within the pleura. It is chiefly the cases of this latter description which we propose now to examine.

It would appear to be one of the rarest forms of pathological appearance, there being but few cases of it on record; but as they lead us to more precise conclusions regarding the case which it is the more immediate object of this communication to detail, it may be well to begin by an examination of those which are already on record.

1. The first case which I can find of this nature mentioned by authors is related by Corvisart in his translation of Avenbrugger's work on Percussion. "One of my students," says he, "M. Fortassin, about 37 years of age, of a sanguine temperament, of middle stature, and of a good constitution, having a short neck, brown skin, and ruddy countenance, died suddenly during the night between the 20th and 21st of March 1813. He appeared to enjoy

continued good health. He was, however, subject to hæmorrhoids, coughed sometimes without expectoration, and had often oppression at the chest. On the 19th and 20th, (the night of which he died,) M. Fortassin had dined with good appetite but soberly, and on the evening of the 20th, at supper, he was unusually gay, and did not eat any thing but fruit. About eleven o'clock he felt sleepy, and having gone to his bedroom he undressed himself and went to bed. About half-past three the attendants went to awaken him for a patient, when he was found dead. He was lying on his belly, his left hand was under his chest, his right hung over the bed. Blood had escaped from his nose and lips."

On opening the body, everything was found healthy and natural except in the chest. Here, however, "the larger vessels, arterial as well as venous, were almost empty of blood, as in persons dead from hæmorrhagy. The left cavity of the chest presented nothing particular; the lung of this side appeared healthy, but on cutting into it a sanguineous engorgement in the superior portion was discovered, and the bronchial tubes of this side contained a certain quantity of dark blood.

The right cavity was filled with dark coagulated blood; all the right lung was gorged as in the most intense pneumonia. Its surface presented several rents which extended into its substance.

The substance of the viscus was so macerated and changed in appearance, so confounded with the compact coagula with which it was surrounded, that they could not be separated but with the greatest care. When a section was made through the lung and these masses, it could not be distinguished where the one began and the other ended. The bronchial tubes of this side were filled with black fluid blood, which was also contained in the trachea, larynx, throat, and nasal fossae. The œsophagus was entirely empty. All the other viscera of the chest and abdomen were healthy."

2. The next case is related by Bayle in the second volume of the Revue Medicale. It is that of an insane person who was admitted into the Royal Lunatic Asylum at Charenton on the 4th November 1828. "It was observed a few days after his admission that he coughed and expectorated much. During the early days of December his reason returned, and he was calmer. On the evening of the 10th of December he experienced a sudden and violent attack of dyspnœa; the respiration was extremely short and frequent; the face was pale; he was unable to speak; and the pulse was very small. At this time he was bled from the jugular vein, and had sinapisms applied to the chest, in spite of which means, there was a rapid increase of his symptoms, and death took place shortly afterwards.

"In the left cavity of the chest about half a pint of bloody serum was found; and at the lower part of that side of the chest was about one pound weight of clots of black blood, of which part was enclosed within the base of the lung, and intimately mixed with the pulmonary parenchyma, which was excavated, lacerated, and disorganized in this spot, nearly in the same manner as we find the brain in cases of suddenly fatal apoplexy. The base of the lung was adherent to the sides and to the diaphragm. The remainder of the respiratory organs were black, and penetrated with blood, the right being much the same as the left. The lower part of the trachea was ed. The bronchia and smaller tubes had the same colour, bu more marked.

3. The case of Professor Mahon, noticed very shortly by Leroux,[*] seems also to have been a case of this nature. "Mahon died suddenly after having first spit up, and afterwards vomited a great quantity of frothy and clotted blood. Bloody effusion was found in his chest, but neither the heart nor blood-vessels were found injured."

4. A case noticed by Andral[†] may be next quoted. The patient died suddenly of violent dyspnœa, before any diagnosis of the disease under which he laboured could be made. On opening the body one of the points of the surface of the lung was torn to the extent of an inch. On cutting through this point a space equal to the size of a large orange was arrived at, full of the debris of the lung, intimately mixed up with partly liquid, and partly coagulated black blood.

5. A case related by Hohnbaum, which I have not been able to consult. (Ueber den Schlagfluss, Erlangen, 1817, p. 75.)

6. The last case is related by Dr Ferguson in the first volume of the Dublin Medical Transactions, p. 11, 1830. It is that of John M'Leary, a tailor, aged 36, a robust man. "Through this past winter and spring I had occasionally to give this man medicines of a purgative nature, and such as have been termed expectorating;—the latter with the intention, at one period, of removing a bronchitis; and the former an habitual costiveness, the effect, as it would seem, of whisky drinking, in which he too often indulged, though, I have learned, rarely to excess. He applied to me at the Dispensary, Colis Lane, on June the 19th 1829, complaining that his bowels had been confined for some days; that his cough was increased; his chest somewhat oppressed; and his expectoration since yesterday tinged with blood. His countenance was pale, and his skin covered with a cold clammy perspiration; but as I had observed the latter symptoms for some months previously I did not affix any particular value to them. His pulse was feeble, about 90;" he was ordered purgative pills,

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[*] Journal de Medecine Chirurgie et Pharmacie, t. lx. p. 136.

[†] Clinique Medicale, t. ii. p. 167.

with senna mixture in the morning. "Trusting to what I knew of his history, and to former examinations of his chest, I made no stethoscopic examination this day, (a circumstance which I shall ever regret,) the exacerbation of his general symptoms being attributed, as perhaps we were justified in doing, to some previous excess. I heard no more of him until sent for in haste on the Sunday morning following. I found him dead; and it is worthy of remark, that although two hours had not elapsed since his decease, the rigidity of the body was considerable. A neighbouring apothecary had attempted to bleed him, but unsuccessfully. I was told he had passed the preceding night rather restlessly; however, he had his breakfast of soup and bread, and in the act of putting on his shoes, complained to his wife of loss of vision; seemed to faint, and died without a struggle. During Saturday he had expressed himself relieved from the operation of the purgative medicine; and what is a remarkable fact in the history of this case, he had expectorated no blood for fourteen hours before his death; nor in the agony was there any escape of blood from the mouth or nares, which might lead to a suspicion of the real state of disorganization."

*Examination forty-eight hours after death.—Chest.*—The left pleural sac contained about three quarts of blood; the serum supernatant to a great degree, as in blood allowed to stand after venesection, and the clot in considerable quantity, but very soft, occupying the most dependent portion of the cavity. This lung had contracted no adhesions, and on carefully raising it out of its situation, and dissecting it out by its root, the following appearances presented themselves to us. The superior lobe was one mass of the most perfect pulmonary apoplexy; the structure of the lung seeming to be absolutely broken up by the excessive effusion of blood into it." The appearance which this disorganized part put on differed from the liver-like state of the lung as described by Laennec; but it was more like a clot of blood, scarcely bearing to be incised, and broke down easily under the scalpel or finger. "But what most attracted our attention, and in my mind gives its peculiar interest to this case was, that in the superior and posterior part of the affected lobe we found a laceration of the investing pleura of about one inch in length, and half an inch in breadth, with very irregular edges, and immediately opening upon the point, where the sanguineous effusion into the substance of the lung seemed most intense, and where we might naturally expect the greatest violence to be offered to its serous covering. This was evidently the source whence the blood shed into the pleura had come; for on examining as accurately as possible we could discover the rupture of no vessel." The remainder of this lung was healthy, as was also the right. The heart was sound and empty of blood. The blood of the body was generally fluid.

It will be remarked, that these cases are six in number; four of which have occurred in France, and one in Germany and one in Ireland. They all had their origin in internal lesion of the lung and its pleural investment; but the following case presented a somewhat unusual train of symptoms and appearances, from its being complicated with external injury.

About two o'clock on the morning of the 30th of January last, I received an urgent message to visit this patient. She was a married female, about 37 years of age, with a family of four children, of quiet disposition, of temperate and regular habits, and had always been extremely healthy.

It appeared that five nights previously her husband (who, from misfortune in business, had lately given himself much up to dissipation,) had come home in a drunken and quarrelsome state, and had beat and kicked her violently. From the morning after this beating she complained to her friends and neighbours of a severe pain in her right side, which pain she ascribed to the blows of her husband, and which was at times so violent as to cause her to take laudanum for its relief. She was still complaining of this pain on the evening of the 30th January. Upon reaching the house about two o'clock on the morning of the 31st, she was found sitting over the edge of the bed and supported by her husband. With the exception of a large ecchymosis under the left eye, the countenance had a pale and bloodless appearance, her skin was cold and clammy, and her pulse quite imperceptible at the wrist. She spoke little and that only in whispers, referring to the pain of her right side, and more especially to a spot situated over the seventh rib, immediately above the cartilaginous extremity of the eighth rib. The account which she gave of her present seizure was short and simple; she was awoke with a violent pain in the spot referred to with sickness; and upon getting out of bed for a mouthful of water she sank down on the floor and alarmed the family. Upon examining the pained part no swelling or discoloration is visible, but she could not bear it to be pressed or handled, and no fracture of the rib could be detected. Both sides of the chest sound well on percussion. That elicited over the pained part could not be well discerned from the agony it produced. The respiration is rapid but natural over both sides of the chest. There is a slight cough. Heart's action feeble. No pain over abdomen or tympanitic distension.

During the whole of this day she continued in a pulseless exhausted condition, although stimuli were freely and frequently administered. The pain of right hypochondrium continued severe. She could lie, however, without inconvenience on either side; but complained much of the right side upon turning in bed or making the slightest movement.

The next day, or the 1st of February, she presented somewhat of the following state. The countenance pale and anxious; breathing rapid; extremities warm (chiefly by means of artificial heat;) lies on either side with equal ease, and requests often to be turned; pulse imperceptible at the wrist, beating rapidly and feebly in the carotids; no dulness on any part of chest was discovered on percussion; the breathing, however, is accompanied with sibilous and mucous rattles. The pain of side is still the subject of complaint. The voice is stronger, but the words are spoken hurriedly and as if the effort gave pain. The bowels have been freely opened with purgatives and turpentine enemata.

The subsequent day, the 2d February, the symptoms had assumed altogether a worse character. The pain was more severe; the breathing more laborious, and accompanied with numerous large and small mucous rales; cough frequent and harassing, but no expectoration; she requires to be propped up in bed.

The following day her general appearance had not much changed. The breathing was still laborious, but accompanied with fewer mucous rattles. The pulse has returned to the wrist, but is very small, and not to be counted. The chest upon percussion sounds pretty well; there is decided dulness, however, over the lower part of the right side, and the resonance of the voice at the upper line of this dull portion is agophonous. There is also pain on pressure between the ribs throughout the dull portion.

It is unnecessary to detail the daily symptoms of this case. In two days, after the dulness on percussion at the lower part of the right side of the chest had been detected, the whole of that side of chest from below upwards became quite dull. The respiration could be gradually traced leaving the lung as the dulness ascended, until latterly it entirely disappeared from that side, and in two days more the heart was found to pulsate fully two inches to the left of its proper place. The difficulty of breathing, too, had become so great, that she required to be propped up nearly erect in bed, and any sudden change of position produced such distressing dyspnœa as to threaten suffocation.

Under these circumstances, it was thought advisable to puncture the chest, and remove the fluid, or a part of it at least, of whatever nature that fluid might be; consequently, in the evening of the 10th day from the time of the sudden seizure, 16 ounces of a bloody-looking fluid was drawn off. Not the slightest improvement in the breathing resulted from this procedure; it continued extremely laborious; the heart's action was weak; the pulse imperceptible at the wrist; the face pale, and lips and nails of a blue colour; the skin covered with a cold sweat; and she gradually sank, and died calmly, 18 hours after the operation, 11 days after the sudden seizure, and 17 days from the infliction of the injuries.

Her intellectual faculties continued unimpaired to the last; and in connection, it may be remarked, that she frequently stated to her neighbours and friends, as well after the occurrence of the fatal symptoms as previous to them, that she attributed her sufferings to the bad usage of her husband. His treatment too of her during her illness was stated by the nurses to have been harsh.

The bloody looking fluid which was drawn from the chest, upon standing for twelve hours, separated into serum and coagulum, the serum bloody, and the clot dark and soft. The whole weighed 16 ounces, of which there was respectively 11 ounces of serum, and 5 of coagulum.

The diagnosis of this curious case was much cleared up by the fluid drawn from the chest. Previous to this, it had been concluded that a certain connection existed between the injury and the symptoms. The pain which had been experienced in the part from the moment the injuries had been inflicted, rendered it probable that either the liver itself, the diaphragm itself, or the intervening tissues had been the seat of injury, and that the symptoms arose from an abscess or other collection of fluid bursting into the right pleura and giving rise to pleuritis or empyema. When it was found, however, that the fluid contained in the chest was nearly pure blood, our diagnosis was reduced to one of two diseases, either hæmorrhagic pleurisy, or the connection previously supposed between the liver and pleura.

The *post-mortem* examination, however, revealed a very different state of matters.

The body was examined forty-six hours after death. The surface presented an unusually pale and blanched appearance. There was an ecchymosis under the left eye, an inch long by half-an-inch broad, livid in the centre, and orange and yellow coloured at the edge. With the exception of the *post-mortem* lividity of the most dependant parts of the body, no marks or ecchymosis on any portion of the surface was observed. The part which had been the seat of injury was carefully examined, and the skin and subjacent tissues were cut into in various places, but no appearance of thickening or extravasation of blood could be discovered.

Upon laying open the chest, six imperial pints of bloody fluid were found in the right pleura; it contained no loose coagula, but was thicker at the posterior than dependant part of chest. The angle between the diaphragm and costal pleura rising up to the fifth rib was filled by a large black coagulum, and covered over internally with shreds of adventitious membrane. The whole pleura of this side was coated over with this adventitious structure, being thicker and redder, and studded over with bloody papillary elevations, particularly over the ribs anteriorly. No fracture or injury of any of the ribs was discovered. The lung of this side was found diminished to less than a third of its normal bulk, and occupied the superior and posterior part of the pleural sac. It was completely covered over with a layer or layers of adventitious membrane, flocculent at the surface, and stained like all the rest that was found of a reddish colour. The texture of the lung was condensed and contained no air, portions of it sank in water; the bronchial tubes were found filled with muco-purulent matter.

In the lower lobe of this lung, and to all appearance corresponding to the seat of injury, a tumour of the size of a pigeon's egg was found. It occupied the substance of the lower edge of the lung, being covered by pleura and adventitious membrane. Upon separating this inflammatory covering from the pleura investing the tumour, it presented an irregularly mammillated form; at one of these raised points, at the outer side of the lung, and very close to the apex, an irregular aperture, sufficient to admit a crow quill, and filled with a coagulum of blood, was discovered. This aperture led to the centre of the tumour, which contained also a firm dark-coloured coagulum. A probe could easily be passed through the aperture to the depth of half-an-inch or so into this clot. A section of this tumour presented the usual appearance of a mass of pulmonary apoplexy, in the centre the dark-coloured coagulum and several smaller around it, which seemed to have caused the mammillated appearance externally; the texture of the rest of the tumour was homogeneous and of a reddish colour.

The left lung was healthy; the bronchial tubes contained a small quantity of purulent-looking mucus. The heart was of the usual size, and presented no abnormal appearance. The pericardium, as well as the left pleural sac, contained a small quantity of clear serosity. The abdominal organs were healthy.

From the account of this *post mortem* examination, there cannot be a doubt, but that the immediate cause of death was partly the great quantity of blood which had been removed from the circulation into the pleural sac, and partly the pressure which that fluid occasioned upon the heart and left lung. Nor can there be a doubt but that the blood proceeded from the aperture which was found at the lower portion of the lung in connection with the mass of pulmonary apoplexy. In consequence, however, of the poor woman's repeated statements, both before and after the occurrence of the fatal symptoms, that her sufferings originated from the ill-treatment of her husband, it became one of judicial inquiry, and necessary to determine whether or not the injury was the cause of death.

A series of phenomena certainly presented themselves in support of this view, that the symptoms originated in external injury.

There was, *first*, the declaration of the patient herself, that the pain she suffered was caused by the ill-treatment of her husband.

*Secondly,* The fatal symptoms were ushered in by an exacerbation of that pain.

*Thirdly,* The pained part was exactly over the portion of lung which was found ruptured; and

*Fourthly,* It might be argued that the contusion was inflicted over the cartilaginous portion of the ribs, which, from their yielding nature, rendered injury to a subjacent organ quite possible; and that too without fracture or external ecchymosis.

On the other hand, or in favour of its being the result of disease, and altogether unconnected with external injury, there was

*First,* No external swelling or ecchymosis, while there was another ecchymosis on the face.

*Secondly,* The length of time that elapsed between the receipt of injury and attack of fatal symptoms.

*Thirdly,* The presence of a mass of pulmonary apoplexy; and,

*Fourthly,* The absence of all bloody expectoration after the injury.

I am aware that neither the absence of ecchymosis, nor the absence of all bloody expectoration immediately after the injury, nor the length of time that elapsed between the receipt of the injury and the occurrence of the fatal symptoms, are sufficient, singly or conjointly, to lead to the conviction of a certain connection between the injury, and the symptoms and the appearances found after death.

But the cases which we have formerly related, wherein appearances of a very similar kind were found, and wholly unconnected with any external injury, or even the suspicion of it, are sufficient to point out the course which ought to be adopted in giving an opinion under such circumstances. Our opinion was accordingly given, that a sufficient connection could not be established between the injury and death to give rise to the conviction of the party implicated.

In reviewing the history of this case, however, and more especially in connection with, and in comparison with the cases which have been related by others, we find several peculiarities which are worthy of notice.

*First,* It may be remarked that all the other cases, with the exception of the one just described, proved suddenly fatal. The cause of this is at once made apparent when we contrast the respective lesions of the lung and pleura found after death. In this case the pulmonary apoplectic effusion was much less than in any of the others, while the rupture or rent of the pleura investing the lung was also much less. The suddenness and extent of the loss of blood, both into the pleural sac, and externally through the bronchial tubes, is sufficient to account for the rapidity of the fatal result in the one class of cases, while its slow exudation in this one, accounts for the prolongation of the symptoms.

The position, too, of the lesion in the lung is another means of accounting for it. In most of the others it was found in the upper part of the lung; while in this one it was at the lower edge of the lung.

How far the presence of a certain amount of cough may be looked upon as an accessory cause of this affection, it is not easy to determine. We know that an irritating cough predisposes to the occurrence of pulmonary apoplexy; and in the cases which we have recorded, more especially those of Corvisart, Bayle, and Ferguson, a harassing cough, had been present for some time previous. In the case which has just been recorded, a little tickling cough had been going on for some days; but it was not until after the occurrence of the symptoms of sinking that the cough became prominent. I am inclined, therefore, to look upon it as an accessory cause.

It is further a curious point in the history of this case, and worthy of remark,—the suddenness of the depression of the vital powers, while there was still little or but slight dulness to be discovered on percussion even at the lowest part of that side of the chest. This may be attributed to the shock which the nervous system would receive on the occasion of the rupture of the lung, and first effusion of blood into the pleura. Patients have been known sometimes to faint on the occurrence of pleurisy, or the first pleuritic effusion; and this patient was quite a subject for such an occurrence,—being a nervous woman, previously worn out with pain and suffering. This depression of the vital powers, no doubt, also assisted in retarding the effusion of blood into the chest,—and consequently the fatal result.

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## Art. VIII.—*Cases illustrative of the Contagious Nature of Puerperal Fever, and its intimate connection with Erysipelatous and Phlebitic Inflammation.* By Alexander Peddie, M. D., Fellow of the Royal College of Physicians, Edinburgh, Medical Officer to the Minto House Hospital and Dispensary, &c. (Read before the Edinburgh Medico-Chirurgical Society.)

My principal design in communicating the following series of cases is to bring forward proofs corroborative of the opinion advocated by many medical men, that puerperal fever is contagious when generated under certain circumstances; and, at the same time, to draw attention to the singular and intimate connection or association which that dreadful malady has with erysipelatous and phlebitic inflammation.

The distressing circumstances in which I have been lately placed by the occurrence of these cases convinced me of the propriety, nay, duty of communicating to the profession facts, which, while important in a pathological respect, may perhaps contribute in some degree to avert hazard from a most interesting class of patients, and at the same time preserve to the medical man that peace of mind and prosperity in practice which might otherwise be interrupted. While candour has required this course, I rest assured of obtaining sympathy on account of the painful situation in which I have been placed; and though to some extent the unfortunate medium of spreading a fatal disease, I feel assured that no larger share of blame will be imputed to me than what seems due after the history of these melancholy cases has been carefully and impartially considered.

Case I.—On the 2d September I attended Mrs S., aged 32, at the delivery of her third child. For a month previous to her confinement she was weakly; suffered from pain in the lower part of the abdomen, so much so at times as to induce the belief that labour had commenced; and, according to her calculation, she was a month beyond her time. Her mind, too, had long been much depressed, and a presentiment of approaching death hung over her. The labour terminated at half past four o'clock P. M.; was very easy, lasting only a few hours, detaining me about an hour and a half, and requiring nothing more than the ordinary management. She did well until the morning of the third day, when a severe rigor occurred, followed by violent headach and febrile symptoms. This she attributed to seeing several people during the previous afternoon; conversing with them so long as to produce considerable excitement; and to a night of much fatigue (the nurse having deserted her) with her child, which had been very fretful. The pulse from the first was soft, and ranged from 120 to 150; respiration rapid, sighing, and laborious, as the disease advanced; complexion sallow, with dark leaden-coloured areolæ of the eyes; countenance expressive of much anxiety; eyes pellucid; tongue at first pale and rather œdematous, gradually becoming red at the tip and along the middle and edges, then successively dry, brown, purple, and moist; the forehead, which at first was severely pained, became easier as the abdominal symptoms were developed; and the mind was much disquieted but never unhinged. On the fourth day diarrhœa took place, which continued throughout the illness; and the abdomen, which was but slightly tender from the first, had a doughy feeling, then became tympanitic, and about twelve hours before death enormously distended, at which time also, vomiting of large quantities of dark green matter began and continued to the end.

On the day of the rigor the uterus was felt to be flabby and reaching nearly to the umbilicus; and on examination *per vaginam*, the os was wide open and the cervix puffy. Except for a few hours on the fifth day, the lochia was copious, but unusually dark and offensive. Milk was secreted abundantly, and the breasts went on enlarging until the sixth day, when they became shrivelled, and the secretion much diminished and creamy. The urine was from the beginning scanty, high coloured, and having an acrid odour. No free perspiration occurred until the hours of sinking; but the skin and muscles were peculiarly soft and lax from the commencement of the attack.

Never having attended what I considered a true case of puerperal fever, (although I have had upwards of 500 accouchements since I commenced practice,) it was not until the sixth day that I could persuade myself that this case was more than a severe ephemera, arising from excitement and fatigue on the third day, and the want of careful nursing; and at this time the idea of contagion did not occur to me, for I considered the case at worst to be a sporadic one, elaborated from causes within itself and certain to terminate with itself.

The treatment pursued in this case was at first, gentle aperients, then calomel with Dover and James's powder; afterwards frequent doses of Dover's powder by itself; and the *liquor acetatis ammoniæ* with the solution of the muriate of morphia, and brandy and camphor were given when the pulse began to indicate a tendency to failing of the circulation. The local applications were hot fomentations, poultices, and twelve leeches to the abdomen, and latterly a large blister. Warm water was also frequently injected into the vagina to cleanse away the fœtid lochia; and the catheter was employed at intervals of about six hours to prevent irritation from mechanical distension. Death occurred on the morning of the 10th, the eighth day from her confinement.

I may here state that in the management of this case, as well as in cases third, fourth, and fifth, I had the benefit of the skilful advice and unwearied attention of Dr John Scott.

Case II.—On the morning of the 7th September I attended Mrs W., aged 23, a poor woman, for a medical friend who was out of town. It was her first child, and she was a pale, thin, and weakly person. Her pains began about five A. M., were by no means severe, requiring no interference, and the child was born at half-past nine, three-quarters of an hour after I was in attendance. On the following day I found her quite well, and resigned her to the care of my friend for whom I had been attending.

In consequence of a mistake as to her residence, and the difficulty of finding it, she was unfortunately not seen until the evening of the 11th, when she was found to be in a sinking condition, the most prominent symptoms being a draining diarrhœa, tympanitic bowels, and a rapid pulse; and in spite of the most energetic means then employed, she died on the morning of the 13th, the sixth day from her accouchement.

I may here notice, in regard to this case, that besides being a very delicate individual, she had had so strong a presentiment of death as to prevent her making the necessary preparations for herself or child; and besides being unprescribed for on the first appearance of unfavourable symptoms, she was totally neglected by her nearest relations, and left without any sort of assistance for two or three days.

I was not aware of the progress or fatal result of this case until the 15th, the day after I had delivered my next patient; and although Mrs W.'s case was not considered at the time as one of puerperal fever, I believe it must have been one presenting in some measure the characters of the gastro-enteritic type.*

Case III.—Mrs K., aged 25, a pale and very delicate person, was delivered by me of her second child at half-past nine P. M. on the 14th September. She had been for some time previously in low spirits, and the cause continued to prey on her mind equally after the labour was past. The labour itself was natural, very easy, requiring only the usual attentions, and not such as necessarily to produce subsequent exhaustion.

On the 15th she appeared to be doing well, but on the 16th complained of languor, sleeplessness, and severe pain in her head and eyeballs; and although there had been no rigor, her pulse was 100. On the following morning the pulse had risen to 120; and the case after this period went on presenting nearly the same features as that of Mrs S., Case I., and proved fatal at half-past eight A. M. of the 21st, seven days after the date of her confinement. The treatment adopted was very nearly the same as in Mrs S.'s case, only, when the pulse was not so high, and of greater firmness, and as the pain in the region of the uterus was more decided, blood was taken from the arm to the extent of twelve ounces, as well as withdrawn topically, which practice seemed for a time to produce a beneficial effect. Instead also of a blister being employed, fomentations with warm turpentine were had recourse to.

The occurrence of these cases, the death of two patients and the seizure of a third, naturally caused me to reflect seriously on my position, more especially as on making inquiry, whether any epidemic prevailed to which these might be ascribed, I could hear of no cases at all similar. I therefore felt it my duty, immediately on the appearance of fever in Mrs K., to consult with several medical friends, in whose judgment and advice I could confide, whether I ought for a time to cease from performing obstetric engagements. On considering the circumstances in all their bearings, and while there was a hope that Mrs K. would recover, I was advised that there was no sufficient reason why I should not comply with the next call, but at the same time that every possible precaution should be adopted to prevent the further transmission of the virus. Having used these precautions I subsequently delivered a lady in Portobello on the 19th of the month, another patient in Stockbridge on the 22d, and a third in Rose Street on the 25th, all of whom recovered without showing any disposition to fever. This was all the more satisfactory and encouraging that the first and third of these patients were rather delicate, and the second was sister to Mrs S., (Case I.,) who had died only twelve days previously, and with whom she was much in contact during the fever; and more than this, there must have been here a very strong constitutional predisposition to the reception of the malady, for she was by that event thrown into a state of the most enervating alarm in the prospect of her own approaching hour of trial, gave herself up as lost, and could and would make no preparations for her own necessities. This excitement too, let it be added, brought on labour prematurely, being nearly a month before the expected period.

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* "Puerperal intestinal irritation" of Locock.

The precautions which I used while attending these patients were sprinkling and washing carefully with the solution of the chloride of lime after every visit to Case III., and washing again and putting on a different suit of clothing, not forgetting even a change of gloves and handkerchief, before every visit to my other patients. This was no easy task, considering the attention these patients required, and my numerous other engagements at that time; but it was never on one occasion omitted. As these patients evinced no tendency to the disease, I felt disposed to view the occurrence of the three consecutive cases of fever as one of those singular coincidences with which medical men occasionally meet, or that, if they really resulted from infection, the strength of the virus had been now exhausted or overcome by the use of the precautions adopted. These sanguine hopes, however, were soon most distressingly disappointed by the occurrence of the two following cases in rapid and confounding succession.

CASE IV.—Mrs T. aged 29, resided a few doors from Mrs K. (Case III.) with whom she was very intimate. She was with Mrs K. on the evening of her delivery, and continued to render her to some extent the assistance of a nurse until the 16th, when the fever showed itself; and although strictly prohibited from exposing herself longer, she visited Mrs K. again on the 18th, and gave assistance in making some changes of clothing, and about the bed. I have no doubt that this visit was the occasion when the contagious fomites were obtained by Mrs T.; but even after this period she might have received the virus, for mutual friends were constantly visiting the one after sitting at the bedside of the other.

Mrs T. was taken in labour (at her full time) on the morning of the 26th September. It was her second child, and the labour was very easy, lasting altogether about four hours, during one of which only I was in attendance, and terminating at twelve o'clock noon. In the evening she seemed well, and talked with apparent cheerfulness, yet her mind evidently dwelt much upon the fate of her late friend. I unfortunately did not see her next day until about four P. M. having been detained from five A. M. until one P. M. with Case V., next to be related, and afterwards at an examination before the Sheriff in a case of lunacy. On calling at that hour I found that, at twelve o'clock,—precisely twenty-four hours from the time of her delivery, she had been seized with a violent rigor, that ever since there had been extreme cephalalgia, heat, and restlessness. Her pulse was 120, firm and strong; and there was very considerable tenderness over the lower part of the abdomen, where the uterus was felt to be large and rather hard.

As the combination of a very mild antiphlogistic with the diaphoretic and stimulant plans of treatment had proved unavailing in the former cases, I was induced, in accordance with the recommendation of several eminent authors* on puerperal fever, to try the effect of free venesection in this the early stage of the disease. The practice seemed the more feasible in Mrs T.'s case, as she was not a weakly person. I accordingly drew blood to about twenty-two ounces, when syncope occurred. I then gave eight grains of calomel and fifteen grains of Dover's powder; and in the evening, when reaction was established, the pulse strong, and a return of pain being felt in the iliac regions, I ordered one dozen of leeches to be applied to the seat of the pain, and warm poultices to be continued throughout the night. When I called next morning the pulse was 130; and from this period the case assumed a similar aspect, and took a similar course, as noted at length in Case I., with the exception of a longer delay in the affection of the general peritoneal lining. The fatal termination occurred on the 30th at seven P. M., the 5th day after her confinement.

CASE V.—On the 27th September, at five A. M., I was called to attend Mrs T. aged 23, of her first child. The delivery was completed at twelve o'clock noon, the precise time when Mrs T.'s (Case IV.) rigor occurred. The first stage of labour was very easy; the last tedious,—the child's head being arrested in the pelvis nearly four hours, owing to an immense accumulation of fæces in the rectum, which was removed by enemata. I may here notice that in this case there was a much larger quantity of blood lost, (but not beyond the average amount,) with the expulsion of the placenta, than in the others, in all of which the loss was very trifling; and another circumstance which I observed in this as in all the other cases, was, that after the placenta was expelled, which process was accomplished naturally, the uterus remained of much larger size, and with much less hardness and firmness than is usual; and that the os remained very wide open, and the cervix without the tendency to contraction, which is usually felt on examination at this stage. These facts may perhaps point to some important guides in tracing the steps by which the poisonous agent producing puerperal fever gains admission to the system; and to an understanding of the primary effect exerted on the uterus itself, as shown by the degree of enervation and relaxation produced in the vascular apparatus and muscular textures. But I stop not to speculate. In the evening I found her dull, restless, complaining of slight headach, and general soreness; and there was something in her general appearance and expression which filled me with apprehension for her safety. I endeavoured to shake off these fears as imaginary—originating in the distressing impressions of recent events, and the serious aspect which Case IV. had assumed that day, and tried to entertain the hope that these symptoms proceeded merely from the excitement which often exists, to a considerable extent, from six to twelve hours after delivery, and which terminates in a healthful reaction. On visiting, however, next day at eight A. M., I found my worst fears realized. She had become more and more restless since the previous night; and about an hour and a half previous to my visit had shivered severely. There was now slight headach; considerable heat of skin, with a soft and powerless feeling of the muscles; pulse 98, full and strong; countenance dirty-looking, with patches of yellow, brown, and red, and with great anxiety of expression; tongue white; considerable thirst; breathing conspicuous;* abdomen painful on pressure in the region of the uterus, which organ was felt to be large and as if doughy. The lochia was profuse, but dark and rather offensive for the short period since parturition. Milk was appearing in the breasts.

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* Mackintosh, Campbell, Lee, and others.

Taking the pulse as my guide to practice, and not yet being in the possession of a decided experience as to the effect of bleeding in Mrs T.'s case, I opened a vein until about fourteen ounces were drawn, and syncope was threatened. The remaining progress of this unhappy case was marked by no difference in symptoms from the preceding ones, excepting that it was attended with very little abdominal tumour or tenderness, with incessant vomiting of dark-coloured fluid so early as the morning of the 29th, and that it ran its course with fearful rapidity in spite of the early and well-sustained efforts which were made to support the strength. Death took place on the 30th about 3 A. M.—the third day from the period of delivery not yet having been completed.

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* This breathing reminded Dr Scott very much of the breathing which he had seen in the last stage of cholera.

The history of symptoms in these five cases has been very briefly detailed, because this form of puerperal fever being a combination of the adynamic type, with a slight degree of the metro-peritonitic, is no novelty, and has been ably delineated in all its features by Gooch, Moore, Ferguson, Locock, Rigby, and others. Nor has any minute account been given of the treatment employed, because it embraced nothing new, but consisted of a selection and combination of the plans and suggestions of those who have had the most extended acquaintance with this most intractable and malignant malady, and applied according to the indications of each case. The main object of the present communication is to draw attention to the strong evidence in proof of the extraordinary subtlety of the morbific influence which generated the fever in these cases, and was transmitted, independently of locality,* from one unfortunate sufferer to another with so much rapidity and insidiousness. It took me, as appears from the foregoing narrative, entirely by surprise in Cases I, II, and III, before there was an opportunity of benefiting by the warnings of experience; and after most assiduous precautions and lapse of time had secured the safe delivery and recovery of three individuals, and lulled anxious fears into security regarding the propagation of the disease further, it was brought back to me in all its virulence by Case IV, who had retained it about her person and clothing from Case III—with whom she had so much intercourse, and was then unconsciously conveyed by me to Case V, in whom it was developed with so fearful a rapidity of action as to show itself almost from the moment of parturition, and destroy its victim in a shorter time than the individual from whom it was communicated.

The distress which these unfortunate cases occasioned to me will be readily understood by any right-thinking and feeling individual; and I am confident that, from what has been and yet remains to be stated, the occurrence of them will not be imputed to me as a matter of blame, but regarded in the light of a misfortune.

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* Case I. was in the new town, Case II. in the old town, Cases III. and IV. in the west end, and Case V. in the south side of the town.

On the death of the last patient, (Case V,) I immediately abandoned practice, and on consulting with professional friends, determined to allow a fortnight to elapse before resuming obstetric engagements, and during the interval, to adopt means, such as a change of air, ablutions, &c., to free myself from the contagious virus. I may here observe that I have nowhere met with any author who says that more is necessary. Being much indisposed from fatigue and anxiety, and affected with sore throat, I was confined some days at home, taking medicine, the warm bath, &c.; and at the same time the clothes which I had worn while attending these cases, were exposed in a very airy chamber, and frequently sprinkled with the chloride of lime in solution. I then resided several days at the sea side, and afterwards went on an excursion of four days into Perthshire and Stirlingshire, wearing all the while the affected clothing. Before returning to the duties of practice, and being called to another accouchement,—a fortnight less one day intervened; and as this very melancholy case has been viewed by some,—who I admit are well able to judge in such matters, as a species of contagious puerperal fever, I shall record minutely its features, so that others may have the means of forming an impartial opinion as to its true nature. I may say, however, that, after the most close and careful consideration, I am inclined, from the special circumstances in the condition of the patient, and from the total dissimilarity in type and progress from the preceding cases, to regard it rather as a remarkable coincidence of fatal disease subsequent to parturition than as a case of puerperal fever. Had I met with it in practice entirely unconnected with such a series of cases, I should never have supposed it as belonging to this class.

Mrs M., aged 30, was under my care in May last, (the fourth month of her pregnancy,) on account of a diarrhœa, which lasted for a number of days; and again in July, on account of troublesome palpitation, and fluttering sensations about the heart, with tendency to fainting and giddiness. She was an anæmic subject; and on careful examination of the heart at this time, I was of opinion that a considerable dilatation existed. During the whole month of September I attended her several times daily on account of excessive diarrhœa, evidently betokening the existence of ulceration, there being sometimes as many as eight or ten evacuations in the twenty-four hours, mixed with mucus, blood, and purulent matter. This condition was much aggravated by the cardiac symptoms, and was attended with extreme prostration of strength, a pulse seldom under 100 during the day, and much higher at night, when feverishness generally increased and passed off again in a few hours with considerable perspiration. At this time I despaired of her recovery, and looked forward to her approaching accouchement with the most apprehensive anxiety; and her own spirits were all along much depressed. For more than a fortnight, however, previous to labour, her bowels were opened only two or three times in the day; and she had recovered so much strength as to enable her to leave her bed, and walk from one room to another. On the forenoon of the 12th of October, a sudden fit of vomiting ruptured the membranes, and from time to time, until next forenoon (the 13th) a slight pain only was felt, and at five P. M. the same day, after a few hours' labour of ordinary severity, during which time I was in attendance, she gave birth to her child. There were no unfavourable symptoms until the third day (the 16th,) when she complained of tingling sensations over the whole body, but no distinct shivering. She was anxious about herself, and was restless and agitated. In the forenoon of that day there was considerable heat of skin, but towards evening a copious perspiration occurred; and when Professor Simpson saw her with me then, her condition was the following;—tongue clean; slight thirst; no headach; pulse 100, pretty full, but soft; no tenderness or swelling of the abdomen; uterus large and flabby, reaching nearly to the umbilicus; skin soft, covered with a copious perspiration; muscles in general relaxed; bowels once gently opened that day; urine in ordinary quantity, and easily voided; lochia pale-coloured and scanty, (but it must be remembered that she was an anæmic subject,) and the breasts were large, firm, and secreting a tolerably good flow of milk. Dr Simpson regarded the perspiration as favourable, and recommended that it should be gently kept up by the exhibition of frequent small doses of Dover's powder as long as the pulse and other symptoms indicated the existence of febrile action, and to avoid equally any stimulating or depleting remedies. Viewing the case also at this period as suspicious of the phlebitic form of puerperal fever, Dr S. declined, for obvious reasons, another consultation. From this period,—the evening of the 10th, until the morning of the 21st, she continued to improve; the pulse lower each successive morning, but never under 88, and rising again each night, but never attaining beyond 100; and all the while there was a very free state of the skin, it being easily and powerfully acted on by the Dover's powder, when any increase of fever had taken place. The flow of milk and urine was copious, but the lochial discharge was pale and in sparing quantity. The bowels were naturally opened every day; the tongue was clean; thirst considerable; appetite very moderate; head quite free from pain; mind not confused but still depressed; uterus, which on the 16th was large, gradually diminished until it was not to be felt on the 21st above the pubes; and the abdomen was never affected with the slightest degree of pain or tympanitis, but rather seemed more collapsed than is usual at so short a period after parturition. On the morning of the 21st, however, a slight rigor occurred, followed by a hot and sweating stage of a few hours' duration; and in the evening of the same day another paroxysm recurred, rather more severe, and lasting altogether nearly twelve hours. From this period an improvement took place in every respect, and her condition at mid-day on the 23d was the following:—pulse 84; tongue clean; head free from pain; spirits for the first time elevated; natural appetite returned; alvine and urinary evacuations natural and free; lochia rather more abundant, and redder; skin pleasantly warm and moist; abdomen without the slightest tumour or pain on being subjected to pressure; and the inferior extremities were without swelling, pain, or uneasiness in the course of the veins. In fact, I considered her out of danger, and spoke of her being out of bed in a few days, and taking some management of the child. On the afternoon, however, of this day,—the tenth from her confinement, she was unhappily subjected to considerable mental irritation and excitement, and soon after discovered symptoms of restlessness and discomfort. At 11 P. M. she had a violent rigor, which lasted about twenty minutes; and the heat was succeeded by some confusion of head; pulse gradually rose to 120, full and soft; but, notwithstanding the most assiduous efforts during the night, by means of hot poultices to the abdomen, Dover's powder, warm drinks, &c., the perspiration, which formerly was so easily brought out, could not be produced. As the morning advanced, the confusion of head increased; she became more fretful, wandered a little, and at 9 o'clock, with a sudden shout of laughter, fell into a violent convulsion, in which she continued without any remission until about half-past twelve in the forenoon, when death relieved her struggles.

Eleven days had thus elapsed from the period of her accouchement to this sad event. Dr Alison, I may notice, saw her shortly before her death; and I would gladly have availed myself sooner of the benefit of his advice, or of that of some other eminent practitioner, but for the rapidity of the illness, and the prospect until the convulsion occurred, of a timely diaphoresis bringing with it relief and recovery.

A *post mortem* examination of this singular case was very desirable, but could not be obtained, in consequence of the peculiar ideas and feelings of the relatives. With regard to inspections of the other cases, I may here state that for several reasons I made no applications to obtain such,—1*st*, because, from the report of numerous cases, it seems well established that such examinations are extremely dangerous for the propagation of the disease;* 2*d*, because all the cases occurred in that station of society, where an autopsy is almost invariably refused, unless death has been very sudden, or unless there has been some dispute or mystery about the cause; and, 3*d*, because there have unfortunately been a sufficient number of *post mortem* inspections in cases of puerperal fever to exhibit all that dissection can discover. In many hundreds of autopsies, conducted by the most able men of past and present times,[*] it has been abundantly ascertained, that in those cases partaking of the purely inflammatory type of the disease, the structural changes are, various degrees of softening and disorganization of the substance of the uterus, purulent matter found in the veins in some instances, and as often not;[†] thickenings and depositions of lymph on the peritoneal covering of the uterus and that of its appendages, as also of the general lining of the abdominal cavity, with adhesions of various strength, and effusions of fluid more or less albuminous, serous, bloody, or purulent, and the same depositions now and then in the cavities of the pleura and pericardium. And then, again, in cases of the type to which the present series more properly belong, the same appearances have been discovered, but generally to a much smaller extent. Sometimes even the existence of inflammatory action more especially as regards the uterus, being scarcely traceable;[‡] but when there is effusion into the abdominal cavity, it is generally turbid, and peculiarly glutinous;[§] and the intestines are usually inflated with very fœtid gas.

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* Dr R. Lee, in the Medical Gazette, August 1843, relates the case of a practitioner in London in 1831, who had three cases of puerperal fever, shortly after opening the body of a person who died of the disease; that he himself in 1835 had two cases immediately after an autopsy, notwithstanding the greatest precautions; again, in 1836, he had one case, and another in 1839. Dr Merriman had one case of pu-

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erperal fever on the morning following an inspection in a similar case, even although he did not touch the body, (vide Provincial Journal, No. 166.) Many like instances are well authenticated, and several have been stated to me by medical friends,—among the most singular of which was the occurrence of three cases to Dr Paterson of Leith from simply touching a portion of the uterus in the possession of Professor Simpson, of a person who had died of puerperal fever; and the danger of such autopsies is made yet more apparent by the fact that, while Dr Simpson obtained this preparation at an examination of one of the five fatal cases recorded by Mr Sidey in this Journal for 1839, Dr Simpson himself had four cases of puerperal fever immediately following.

[*] Leake, Hulme, Hunter, Hey, Armstrong, Gooch, Lee, Tonnellé, Clarke, Meckel, Ribes, Dance, Arnott, Collins, Lee, Mackintosh, Campbell, Hall, Fergusson, Locock, &c. &c.

[†] Mr Moore, who has perhaps written the best monograph on puerperal fever, says, when alluding to the relations of French and German pathologists regarding the detection of purulent matter in the veins, "In this country, however, *post mortem* examinations, not excepting those conducted by our best anatomists, have generally failed to detect purulent matter in the veins."—Enquiry into the Pathology, &c. of Puerperal Fever, p. 69.

"Phlebitis or any other local inflammation cannot be considered the cause of that malignancy which puerperal fever evinces, since that character is exhibited with nearly equal precision when associated with either of the various conditions beforementioned, (effusion into the peritoneum, &c.), proving *that structural derangement is but an accident of its course*."—Ibid. p. 79.

"To believers in the identity of peritonitis and puerperal fever, we can show puerperal fever with a perfectly healthy peritoneum. To those who insist on inflammation of the uterine veins as constituting puerperal fever, we can show the genuine disease without this condition."—Dr Ferguson on Important Diseases of Women, p. 81.

[‡] Dr Collins of Dublin, in describing the morbid appearances in thirty-seven cases examined by himself, says, "The uterus was in the great majority quite natural in appearance; in some it was soft and flabby; and in a few unhealthy matter was found in the sinuses.

[§] Noticed by Dr Collins.

Autopsies, I believe, can do little more in clearing away the difficulties which surround the consideration of the nature of puerperal fever, or in leading to a better means of cure. They have as yet discovered no pathognomonic mark by which to recognise the malady—nothing but variety of appearances. The symptoms during life are far more distinguished and characteristic, and point out the disease, seldom to be mistaken from other affections. And the reason why local changes and lesions of structure have been so little explanatory is, that they only occupy a secondary place in the diseased action, the general febrile disturbance being the proximate cause. The words of Mr Moore well express the bearings of the subject. He says, " The most legitimate conclusion to be deduced from the fact, that these varieties arise under the same circumstances, would appear to be, that the specific and essential malady, denominated puerperal fever, depends not for its origin or maintenance on the inflammation which in its progress may exert a disorganizing influence on those structures to which it happens to be directed. The fever and the inflammation probably result from a common cause, which acts directly on the vital functions associated with those organs affected, either by an impression produced immediately through the nervous system, by the propagation of morbid matter from without, or by the circulation of deteriorated blood."*

In connection with the case which I have last detailed, I may add, that, although not persuaded of its identity with the preceding instances of distinctly contagious disease, yet I have refused all requests for attendance in labour since its occurrence; and I consider it my duty, since there is a doubt regarding its nature, to abstain from obstetric practice for a considerable time to come.

In bringing this long, and I fear tedious paper to a close, I shall not trespass upon your time by offering any speculations regarding the nature of puerperal fever. Facts at all times are infinitely more valuable than theories; and had the many distinguished writers on the subject theorized less and confined themselves more to facts, there might not perhaps have been so much bewilderment at the present day, both regarding its nature and treatment; for certainly on no subject in the whole range of medicine do we find advanced more conflicting opinions, or more partial and prejudiced statements. The reasons of this, however, are obvious. Particular epidemics of this disease differing from each other most materially in character and consequences, just as in the epidemics of other maladies;—the occasional occurrence of sporadic cases as varied in their features and relations; and the sudden advent of a series of cases originating from contagion or under special circumstances, and almost always malignant, have each in its turn been made the pivot on which to balance a favourite theory. Were I therefore to attempt the deduction of theoretical inferences from the few cases with which I have had the misfortune to meet, I would be committing the same error that has occasioned the confusion and uncertainty to which I allude.

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* Enquiry into the Pathology, &c. of Puerperal Fever, page 84.

There are, however, a few topics which naturally spring out of the consideration of these cases, which, if time permitted, might afford matter for much interesting and instructive discussion and remark. For example, I might seek to inquire concerning the nature of this extremely subtle* and powerfully concentrated virus, which propagated itself so fatally from one victim to another in spite of the great precautions adopted; and inquire in what way it got admission to the system, whether by direct inoculation, by simple contact with person and clothing, or by the inhalation of an impregnated atmosphere. I might also speak of the strong confirmation which these cases afford to the generally admitted opinion that debility of constitution, as also mental disquietude and despondency, present a very great attraction and predisposition to the reception of this, as well as any other specific poison exerting a contagious influence; and the support which these cases afford to the opinion that puerperal fever, when resulting from contagious influence, is propagated in its own sphere of action with more undeviating certainty and more deadly power, than the same disease when occurring in the course of an endemic or an epidemic, and infinitely more so than when it happens to have a sporadic origin. I might also notice the peculiar malignancy of this type of fever—its intractableness (as all who have ever met with it acknowledge) to the appliances of art, however varied and judicious they may be.† On such topics, however, I shall not enter, but pass on to show, in a very brief narrative, the singular connection, or at least association, which these cases had with erysipelas and phlebitis, an alliance which has been frequently pointed out by writers on this subject.‡

When the first case of puerperal fever happened in my practice, I was visiting a gentleman twice daily with erysipelas, spreading from sinuses which surrounded the right hip joint, and had their origin from a mismanaged bubo and a much impaired constitution. This case was the most malignant one of the kind I ever witnessed, proving fatal on the 16th September, after his body had for some time become deeply jaundiced, and large purulent deposits, attended with considerable emphysema, had formed in the right knee and left shoulder joints, as also among the muscles of the right forearm. After applying the usual dressings to this case, there being a very copious discharge of dark-coloured fœtid matter from the sinuses, I was on every occasion most careful in attending to ablutions, for the sake of personal comfort, not from the remotest idea of averting bad consequences from those with whom I might come in contact; and it was only the progress of events which suggested to my mind the probable relation which this malignant case bore to the subsequent disastrous cases in the accouchement chamber; and after this idea occurred, and was stated to some medical friends, it was confirmed by cases very similar in many respects, which I find related in an interesting, able, and candid paper, by Mr Storr of Doncaster,* and which happened both in his own practice and in that of others.

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* Some years since Dr Allen of York, after having a long list of fatal cases of puerperal fever, had no other instance of it until two months subsequently, when a patient attended by his assistant in a pea jacket, worn last by Dr Allen when in attendance during a whole night on a case of the fever in an advanced stage, was seized with it.—Provincial Journal, No. 166.

† "It may appear presumptuous to recommend any course of treatment in a disease which, as far as we know, has always been fatal, &c." Locock, Lib. Pract. Med., vol. i. p. 361.

‡ Gordon of Aberdeen, Gooch, Nunnely; and vide also the excellent paper of Mr Sidey, in the Edin. Med. and Surg. Journ. 1839, p. 138.

During attendance on this individual I delivered Cases I., II., and III. But in order to show what weight is to be attached to evidence of an animal poison being conveyed from this case of gangrenous erysipelas to the labour cases, it is proper to mention that I delivered another patient on the same morning as Case I., and that I continued to visit her from day to day until the 10th of the month. While attending Case III. I had only another patient affected with erysipelas, but of a mild character, in the case of a boy, from whom I had removed a finger much injured by machinery. During attendance, however, on Cases IV. and V. I had four cases of erysipelas under my care, two of them of the head and face, mild and recovering well; but the other two, those of a brother and sister, were distinctly contagious, of the worst type, and terminated fatally.

These cases, I believe, for reasons already stated, had no influence in generating the puerperal malady; but, as the last two are of interest, as bearing on other points connected with the subject of this paper, namely, the remarkable combination of erysipelas with phlebitic and peritonitic disease, I make no apology for briefly introducing them here. Both patients were advanced in life, the brother, a man of a gross habit of body, affected with hemiplegia some weeks previously, but apparently doing well, and the sister, a very thin and delicate individual.

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* Mr Storr had a long list of fatal puerperal fever cases, from the dressing of a case of gangrenous erysipelas with subsequent abscesses. He also relates that Mr Reedal of Sheffield had five fatal cases from attendance on a sloughing bubo, with erysipelatous inflammation; that Mr Slight of Hull had three fatal cases from attending a case of erysipelas; that Mr Hardey of Hull had seven fatal cases from attending a case of erysipelas with sloughing abscess; and that Mr Allen of York had a long list of fatal cases originating from one of erysipelas.—Provincial Medical Journal, No. 166, December 1843.

Having come from the country to nurse her brother, and being exposed to much cold and fatigue in her attendance, on the 17th September she became affected with an erysipelatous sore throat, from which the inflammation spread along the lining of the nares, and thence extended over the head and face. So far her case, although severe, appeared to be progressing favourably, when she was seized with phlebitis in the left leg, where there was a slight varix of long standing. It began with excruciating pain of the whole limb, and was speedily followed by a tense colourless swelling, — which subsequently became purple; it was attended with muttering delirium; and death took place on the third day from its occurrence. The brother, who lay in an adjoining apartment, had had a seton introduced in the nape of his neck, two days prior to the appearance of erysipelas in his sister. The same attendant who nursed the sister dressed his neck and assisted him otherwise; and in a few days erysipelas appeared in the neighbourhood of the seton, spread quickly over the greater part of the head, face, neck, and shoulders. This seemed to injure him so little, notwithstanding his previously weak condition, that I cherished the hope of benefit springing out of it for the remedy of his paralytic affection, when suddenly he was seized with peritonitis, attended at first with considerable pain and great general uneasiness; and he sunk on the third day from its occurrence, (1st October,) the abdomen being enormously distended with air and fluid.

What was the precise amount of morbific influence which any or all of these cases of erysipelas exerted in *communicating disease to* any or all of my puerperal patients, or whether the first case of fever originated from causes elaborated in itself, and was propagated to the other sufferers, I shall not pretend to decide; but I shall go on to state some other cases of disease which occurred to me at the same period, of the same character, and which, singularly enough, *was distinctly generated from* puerperal fever, affording a clear additional—a reflex proof, of the mysterious connection which appears to exist between these affections.

Mrs W., a respectable ladies' nurse, who had been a good deal with my puerperal case, No. III., giving enemata, &c., was seized with fever on the 25th September, the day previous to the accouchement of Case IV., whom also she had daily visited up to the time of her own indisposition. At first the fever was complicated with a hernia brought on by severe retching. This I reduced, although the symptoms of strangulation were urgent, and the fever went on in a very usual course until the 30th, when her right forearm exhibited symptoms of acute phlebitis. At first it was simply painful as if rheumatic; it then, without any change in colour, became more and more swollen and tense. She died delirious on the 2d of October.

From this arm I drew blood, when considerable abdominal pain was felt some hours after the hernia was reduced; but the arm was not marked by hardness or pain at the part, or in the course of the vein opened.

Another nurse, advanced in life, who had visited Case III. several times, and had waited on Mrs W., the ladies' nurse, during the first day of her illness, (the 25th,) and had likewise visited Case IV. once on the afternoon of her confinement, (the 26th,) was seized on the 27th with erysipelas of the head and face, and recovered with difficulty.

Another case of fever occurred at the same time that Mrs W.'s was going on, in the instance of an old lady from the country, who had just taken lodgings in the same house. This case, however, was mild, and she made a good recovery.

I may here also state that it was remarked that almost every individual who had visited the house of Case III. during her illness, was soon afterwards affected with ailments of one kind or another, particularly with slight feverishness and sore throats; and it was after my attendance on this patient that I too suffered in a similar way.

As it has been stated by several writers on puerperal fever that a great many of the infants of those who have been affected with it, more especially in lying-in-hospitals, perish soon afterwards, and most commonly of erysipelas, I may mention that, although two of the offspring of my patients died soon after birth, neither were affected with that disease. It is remarkable, however, that the child of the sister of Mrs S., (Case I.) who was confined under such unpromising circumstances, died of erysipelas affecting the genitals.

Viewed even by themselves, these cases prove a great deal; but when taken in connection with the already published facts and opinions regarding the contagion of puerperal fever, they afford a weight of evidence enough to carry conviction to the minds even of those most inclined to doubt.

The principal points which the facts in this paper serve to prove are the following:

1. That a specific virus, of an animal nature, is produced under certain circumstances, and in turn generates a peculiar form of fever in the puerperal state.
2. That that virus frequently originates from erysipelatous inflammation.*

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* Cases of *typhus fever* and *gangrene* also appear to have generated this virus, and communicated it to puerperal patients, occasioning a succession of fatal cases. Provin. Med. Journal, No. 166. Dr Collins mentions the occurrence of two cases in the Dublin Lying-in Hospital, from a typhus patient being put into an adjoining bed.

A very curious case is stated in Mr Storr's paper, of three surgeons in the same town, after being engaged at an autopsy of an individual who had died of gangrene,

3. That, when once generated, it may be communicated from one lying-in patient to another with extraordinary virulence, quite independently of locality, either by direct intercourse or through the medium of a third person; and that this is more likely to happen when the predispositions of a weak body and a depressed mind exist.

4. That it may produce disease of various kinds in non-puerperal individuals, more especially of an erysipelatous and phlebitic character.*

5. That treatment, whether directed by theoretical opinions or the indications of physical signs, is of little avail; but that if any theory is to be entertained respecting this type of puerperal fever, it should be that something of a specific and morbific nature requires to be thrown out of the system,† and the powers of life sustained; and that the practice which holds out the greatest prospect—small at best—of this being accomplished, will be the employment of the diaphoretic and stimulant plans of treatment, according to the stage of the affection.

6. That the principal concern of the medical man, seing that a cure is so difficult and so very rare, should be to adopt every conceivable precaution against the occurrence of a single case of it, or to lessen the risk of its propagation when once established. And to attain these ends, patients in childbed should either not be attended at the same period with cases of malignant or severe erysipelas, or that proper caution should be observed as to ablutions, &c., more especially after contact with any discharge from them; and that when a puerperal fever case does occur, lest it should be something more than sporadic, chlorinated ablutions and change of garments are first required; and then should a second case occur, it would be the safest plan for the practitioner to abandon the practice of midwifery for a time, two or three weeks if possible, and in the interim attempt, by removal into the country, warm baths, and other alterative and purifying means, and by the exposure of the clothes to a free atmosphere or to a high temperature, (150° dry heat,) as Dr Henry recommends, to rid himself of the subtle virus which adheres to him so tenaciously.

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having each of them several cases of fatal puerperal fever in rapid succession some days after the inspection.

* *Peritonitis* also appears, from well authenticated cases, to have been communicated to visitors and attendants of those affected with puerperal fever, and that, too, even in the case of males. Provin. Journ., No. 166 also.

The case recorded at page 92 of this paper is an example of the association of peritonitis with erysipelas,—or perhaps, to speak more correctly, its translation. Dr Abercrombie states that the peritonitis, under such circumstances, is quite different from the ordinary peritonitis, more allied to that of puerperal fever. Dis. of Stomach and Bowels, p. 197, &c.

† This opinion may be held without assenting to all the absurdities of the humoral pathology.

Having already trespassed too long on your time and patience, I shall now conclude with expressing the hope that, as good often springs out of evil, so my sad experience may prove beneficial in the practice of others.

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## Art. IX.—*On a Systolic Murmur in the Pulmonary Artery, and its application to the Diagnosis of Functional and Organic Murmurs.* By Edward Latham Ormerod, M. B., Cambridge, Member of the Royal College of Physicians, Demonstrator of Morbid Anatomy at St Bartholomew's Hospital.

A murmur heard at the base of the heart may generally be followed for some distance along the ascending aorta, and if loud is prolonged into the innominata and carotid arteries. In some cases, however, a murmur is heard loud at the base, and yet not traceable along the aorta, but clearly audible in a line from the third left intercostal space at the edge of the sternum, towards the middle of the left clavicle for the distance of two to two and a half inches. Or a murmur may be audible in this direction at the same time that it is traceable along the aorta.

The frequent recurrence of a murmur in this situation, at the same time that it attracted my attention, gave the means of solving the questions that arose as to the diagnostic value of such a sign, in what vessel was the murmur situated, and what state of things did it denote? The first question can only be settled by an examination of the phenomena displayed in individual cases; the second by the termination of a number of cases in which these phenomena had been observed.

The line above described corresponds nearly to the course of the pulmonary artery, which forms the arc to this chord, the pulmonary valves lying behind the third left costal cartilage at its junction with the sternum, and the bifurcation of the left branch of the pulmonary artery corresponding, at some depth, to the point at which the above line cuts the lower edge of the second left rib. So that anatomy inclines us to believe (and, as it is established that slow feeble currents vibrate more readily than rapid streams in tense vessels, physiology has nothing to object,) that a murmur in this direction is really situated in the pulmonary artery.

Disease of the pulmonary sigmoid valves is so extremely rare, that we have not the opportunity of verifying our diagnosis in a simple case before the heart is much enlarged, (the patient dying of some other disease,) as can so frequently be done for the aortic sigmoid valves. The following cases, nevertheless, will throw some light on the subject.

C. W., aged 21, of a pale cadaverous appearance, complaining of pain in the region of the heart, palpitation and great exhaustion, was admitted under the care of Mr Stanley, for a venereal affection in June 1840. She was liable to sudden attacks of syncope, had anasarca and albuminous urine, cough without expectoration, but was quite free from dyspnœa, and lay in the horizontal position during her stay in the hospital, where, after about six weeks' suffering, she died of sudden effusion into the cavity of the pleura, purpurous spots having made their appearance all over the body at the same time.*

On auscultation a loud systolic murmur was heard throughout the cardiac region, most intense on the sternum at the level of the fourth rib, and traceable from thence to either side, louder on the right side, supposed in the course of the aorta. On the left side the murmur was heard diffused over an extended space, but more intense in a line passing outwards from the point before mentioned. This same systolic murmur was audible throughout the lungs posteriorly; and in the neck a venous murmur could be traced.

The sounds became less intense before her death, but in all other respects remained essentially the same. The diagnosis was given of disease of the pulmonary valves, with or without aortic disease; and dissection proved its correctness, all the orifices being found healthy except the pulmonary, where there was most extensive disease.

Her appearance differed remarkably from that of the next patient. The other symptoms and physical signs, however, were much alike in the two cases.

W. C. aged 28, first came, in May 1837, under observation of Dr Bond of Cambridge, to whom I am indebted for the following notes. He was a waterman of temperate habits, subject for the last two years to palpitation, of which he then complained, with a dragging sensation in the epigastrium, and dyspnœa on exertion, but he was able to retain the horizontal position to the last. The surface of the body was of a dusky purple, but he had no notable distension of the superficial veins, nor jugular pulsation. He had anasarca and ascites from time to time, and died gradually with these symptoms in December 1839.

There was dulness on percussion in the region of the heart for a space of two inches square. The heart's impulse was increased and extended. There was a loud harsh murmur nearly synchronous with the systole, loudest and harshest to the left of the sternum in the third intercostal space, but audible all over the cardiac region and in the epigastrium. The sounds continued audible in the same situation, but not at the same time, till his death; for the murmur after the lapse of a year was found to have become diastolic.

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* The further details of this case have been published by Mr Paget.—Trans. Med. Chir. Society, vol. xxvii. pp. 182 et seq.

After death the heart was found nearly twice its natural size, and the pulmonary valves agglutinated into a thick cartilaginous ring, leaving a permanent orifice just large enough to admit the passage of an ordinary quill. All the other valves were healthy.

T. B. aged 22, was admitted under the care of Dr George Burrows in July 1845, complaining of pain in the right hypochondrium, anasarca, and ascites, cough and dyspnœa, habitual, but much aggravated during the last eight weeks. His face was dusky and œdematous, but he was reported to be generally free from lividity. He died gradually in the course of the next month with diarrhœa, progressive exhaustion, and loss of heat of the surface.

A well-marked purring tremor was perceptible over all the cardiac region, the heart's impulse was excessive, and there was extended dulness on percussion in the transverse direction. A loud, harsh, double murmur was audible over the whole cardiac region, most intense at the junction of the fourth rib with the sternum, but heard also in the ascending aorta. A loud systolic murmur was audible in the epigastrium, and thence communicated upwards over the region of the right ventricle.

After death the heart was found about twice the natural size. The right side was much hypertrophied. The aorta opened into both the right and left ventricles; the aortic valves were healthy, the mitral, though diseased, apparently efficient. The tricuspid valve was thickly set with globular excrescences, some of which had been ruptured, and the pulmonary valves, of which, as in the case of C. W., there were but two, most extensively disorganized by excrescences of the same kind. The sinus of the pulmonary artery was also dilated. Some freshly deposited fibrin lined the pericardium.

In spite of the complicated nature of this case, a diagnosis was made that the sigmoid valves of the right side of the heart were diseased, whatever further lesions there might be. This diagnosis was founded on the fact of the murmur being audible from the epigastrium over the right ventricle, becoming most intense at the junction of the fourth left costal cartilage with the sternum. The correctness of the diagnosis was shown by dissection.

Leaving out of consideration all the constitutional symptoms, it appears that the most prominent point which these three remarkable cases possessed in common was a loud, widely extended murmur, heard most loudly to the left of the sternum in the third intercostal space, or a little lower. In the absence of other evidence, it cannot be said how much of the murmur in the epigastrium was referable to regurgitation through the tricuspid orifice; for although this valve was palpably diseased in the last case only, in all the right auricle was dilated. Insisting on what these cases had in common, a correct diagnosis was made in each instance by a different observer. In the absence of all other information on the subject, the results of the observation of these cases would not much aid the diagnosis, but they are very valuable, as showing that the diagnosis can be made by insisting on a small portion even of the evidence which recent cases afford. This evidence is of a character to preclude the possibility of a murmur heard loudest in the direction of, being seated elsewhere than in, the pulmonary artery, while the facts elicited by observation of actual disease of the pulmonary valves add, so far as they go, their positive to the masses of negative testimony.

The next case throws some light on the further direction of the current of blood producing a murmur in the course of the pulmonary artery. G. H., aged 22,* a tall delicate looking young man, under treatment for an abdominal affection, presented on auscultation a distinct diastolic murmur, musical in the course of the pulmonary artery, then soft and blowing as it crossed obliquely from the left to the right side of the sternum, and finally lost in the region of the right ventricle. This case proves that the current of blood which produces a murmur in the line described runs in the direction of the right ventricle. A systolic murmur, which only commences at the pulmonary orifice, cannot supply this link of evidence.

In the absence of any dissection, for the case did not terminate unfavourably, it is impossible to say that there was not here some abnormal position of parts. The experience of any auscultator will inform him, without needlessly lengthening this essay by quoting such cases, how far the situation here pointed out differed from that where murmurs referable to the aortic or auriculo-ventricular valves are usually audible; and as far as a systolic murmur is concerned, that this may be heard in the course of the pulmonary artery where no deviation from the normal position exists, was shown by the dissection of a patient who sunk after amputation, in whom there had been a murmur audible in that situation for some days before his death. There are no grounds, then, for presuming, without positive evidence, that murmurs in this situation are referable to the aorta in an altered position; and as far as auscultation can show the aorta and all the heart to be normally situated, the evidence is conclusive that they are so.

For a murmur may be heard in the aorta in numerous cases, loud and distinct in all its details, where no murmur is audible in the direction of the pulmonary artery at all. Conversely, a murmur may be heard in this direction where there is none in the aorta, as occurred in cases 2 (3), 4 (30), 5 (19), 7 (3), 11 (11), 12 (27). Moreover, a during murmur in the aorta may be accompanied by a musical murmur in the direction of the pulmonary entry, as in case 18 (28), not to mention other slighter differences in character, as in cases 17 (2), 19 (40), and the varying degrees of intensity so frequently noticed in the tables as occurring in the two situations.

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* See the parallel case of Edmond Rogers. Hope on the Heart, 3d ed. p. 599.

The conclusion is briefly this,—that murmurs which rise and fall in intensity, quite irrespective of each other, which are of different characters, and may exist mutually independent of each other in their appropriate situations, cannot be referable to the same cause; and this the more evidently, as there is a cause in operation in each situation notoriously capable of producing these murmurs in one as much as in the other. We refer one set to the aorta, the other, on the same grounds, to the pulmonary artery.

Not to overload the present subject by considering difficulties which can never arise, we may omit all mention of murmurs at the apex, and notice only murmurs in the innominata veins to show that "a loud continuous hum heard in the jugulars, and prolonged beneath the clavicles in the direction of the innominata veins," could, were it even otherwise than extremely rare, give rise to no error in diagnosis.

On this foundation we would rest the assertion that a murmur heard loudest in the situation so often alluded to is to be referred to the pulmonary artery. It remains to investigate the nature of the cases in which this murmur is generally audible.

For this purpose the results of the auscultation of thirty-two cases have been registered in a tabular form. In all of these, at one time or other, a murmur was plainly distinguishable in the pulmonary artery. They were for the most part recent cases, in which, putting aside all question as to the original cause of the affection, the physical examination could give no certain information as to the existence of any organic lesion of the heart. For the prognosis, then, in one point of view, they are unexceptionable, at the same time that the simplicity of the cases renders the diagnosis less exposed to errors of observation. Had a record been preserved of all the cases examined in the collection of these clearly distinguishable murmurs in the pulmonary artery, some more satisfactory information might have been furnished as to the proportion of cases in which a murmur is audible in this situation.*

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* Of 27 consecutive cases of chlorosis and its kindred maladies,
8 had murmurs at the apex.
$22\left\{\begin{array}{l}\text{15 in the aorta.}\\ \text{19 in the pulmonary artery.}\end{array}\right\}\text{base.}$
19 out of 21, in the jugular veins.

It is necessary to add, that not more than 3 or 4 of these cases were used for the formation of the tables accompanying this essay.

They are divided into two series, the first containing those cases in which one or more murmurs disappeared; the second, those in which all the murmurs remained audible so long as the patients continued under observation.

The first column contains the number by which the case is referred to, with the name, age, and name of the disease of the patient, and the number of days over which the observation extends subjoined, and the date of each examination recorded during that period. Of the examinations made previous to the development of a murmur, or after their entire removal, no mention is made here, though such examinations, especially those confirmatory of the removal of the murmurs, frequently were made.

For brevity, as well as for convenience of reference, the existence of a murmur in any situation is denoted by the name merely of that situation, which also is expressed by an abbreviation, and where not otherwise stated, the murmur is to be understood as having been audible with the systole only.

First series of cases presenting murmurs in the pulmonary artery, containing those in which one or more of the murmurs audible in the region of the heart were removed.

| | | |
|---|---|---|
| 1 Sarah Crawley, 24, acute rheum. 14 days. | 1 | Base, not beyond. |
| | 9 | Pulmonary artery only. |
| | 14 | No murmur any where |
| 2 M. A. Poole, 20, anæmia. 6 days. | 1 | Base and apex. |
| | 3 | Pulmonary artery. Aorta none. Apex faint. |
| | 5 | Base none. Apex faint. |
| | 6 | Base none. Apex none. |
| 3 Wm. Smith, 15, anæmia, fever. 16 days. | 1 | Aorta. Pulm. artery short. Apex. No vens. mur. |
| | 3 | Aorta. Pulmonary artery more intense. |
| | 13 | Aorta loud and blowing. Pulmonary artery less so. Apex fainter. |
| | 16 | No murmur. Systole ringing but clear. |
| 4 Sarah Pickett, 17, acute rheum. About 2 years. | 1 | Murmur in aorta and pulmonary artery. |
| | 30 | Aorta none. Pulmonary artery. |
| | | No murmur any where. |
| 5 Wm. Stockham, 24, acute rheum. 52 days. | 1 | Base somewhat masked by a friction sound. |
| | 3 | Base as before. |
| | 4 | Base. Apex. |
| | 5 | Base. Apex. |
| | 19 | Pulm. art. loud, harsh. Aorta none. Apex blowing. |
| | 52 | No murmur anywhere. |
| 6 Sarah Mountney, 23, acute rheum. 64 days. | 1 | Base loud, harsh. Apex faint. |
| | 2 | Pulm. art. loud, harsh. Aorta faint. Apex soft. |
| | 3<br>4<br>6<br>8<br>9 | Same sounds on auscultation. |
| | 14 | Base faint. Not prolonged into aorta. Venous murmur. Apex not examined. |
| | 15 | Sounds generally fainter. |
| | 16 | Sounds generally louder. |
| | 17 | Pulm. art. loud. Innomin. art. none. Apex faint. |

| | | |
|---|---|---|
| | 22 | Pulmonary artery louder than aorta. Apex. Sounds generally less harsh. |
| | 28 | Same auscultation. |
| | 36 | Base as before. Apex, long systole. |
| | 43 | Base soft. Apex none. |
| | 57 | Base, not beyond. |
| | 62 | Base, not beyond. |
| | 64 | No murmur any where. |
| 7 Emma Lawrence, 28, acute rheum. 21 days. | 1 | Pulm. art. Aorta none. Apex. Venous mur. |
| | 2 | Same sounds generally fainter. |
| | 3 | Pulmonary artery soft. Aorta none. Apex rough. |
| | 5 | Same sounds generally. |
| | 6 | Do. |
| | 7 | Pulm. artery and aorta, long systole. Apex harsh. |
| | 8 | Pulm. art. louder. Aorta as before. Apex fainter. |
| | 10 | Base faint. Apex faint. |
| | 12 | Do. do. |
| | 13 | Do. do. |
| | 16 | Base long systole. Apex. |
| | 17 | Do. do. |
| | 19 | Base as before. Apex not examined. |
| | 20 | Systole generally prolonged. |
| | 21 | Base long systole. Apex. |
| One year after. | | No murmur any where. |
| 8 H. Reynolds, 24, acute rheumat. 30 days or more. | 1 | Heart's sounds ringing. |
| | 2 | Base. Apex. |
| | 3 | Do. do. |
| | 4 | No murmur any where. |
| | 30 | Pulmonary artery. Aorta none. |
| 9 Esther Cooksley, 14, rubeola. 10 days. | 1 | Pulmonary artery louder than aorta. |
| | 2 | Pulmonary artery as before. Aorta louder. |
| | 4 | Base, not beyond. |
| | 10 | Pulmonary artery. Aorta none. |
| 10 Sarah Steele, 34, acute rheumat. 18 days. | 1 | Base none. Apex. |
| | 2 | Base none. Apex. |
| | 9 | Carotids. Apex. |
| | 16 | Pulmonary artery, (prolonged into the lungs.) Aorta and carotids. Apex musical. |
| | 18 | Pulm. art. Lungs. Aorta none. Apex musical. |
| 11 Henry Bradbury, ac. rheum. 11 days. | 1 | Base soft. Apex none. |
| | 2 | Base louder. Apex none. |
| | 6 | Base, and prolonged into the arteries. Vens. mur. |
| | 7 | Same sounds generally. Apex distinct. |
| | 11 | Pulmonary artery distinct. Aorta none. Apex faint. Venous murmur. |
| 12 Maria Brigg, 21, acute rheumat. 27 days. | 1 | Base none. Apex. |
| | 4 | Base. Apex. |
| | 6 | No decided murmur anywhere. |
| | 8 | No murmur. |
| | 15 | Base none. Apex. |
| | 20 | Base doubtful. Apex musical. |
| | 27 | Pulm. art. musical. Aorta none. Apex blowing. |
| 13 Hy. Shepherd, 14, fever, rheumatism 6 months | 1 | Base feeble. Apex loud. |
| | 6 | Pulmonary artery. Aorta faint. Apex. |
| | 7 | Pulmonary artery faint. Apex harsh. |
| | 9 | Pulmonary artery. Aorta faint. Apex. |
| | 10 | Pulmonary artery louder than aorta. Apex. |
| | 16 | Pulmonary artery and aorta louder. Apex. |

| | | |
|---|---|---|
| | 20 | Base faint. Apex musical. |
| | 24 | Pulmonary artery and aorta. Apex musical. |
| | 26 | Pulm. artery louder than aorta. Apex musical. |
| 5 months after | 1 | Base none. Apex musical. |
| | 18 | Pulmonary artery. Apex musical. |
| 14 Ellen Howell, 15, fever. 15 days. | 1 | Base. Apex. |
| | 3 | Pulmonary artery. Carotids. Apex. |
| | 4 | Pulm. art. Carotids short and sharp. Apex none. |
| | 15 | Pulm. art. louder than aorta. Venous murmur. |
| 15 Caroline Randall, 26, acute rheum. 51 days. | 1 | Crackling sound base and aorta. |
| | 6 | Same sounds at base. Apex blowing. |
| | 13 | Aorta harsh. Apex blowing. |
| | 17 | Same sounds generally. |
| | 18 | Pulmonary artery louder than aorta. |
| | 23 | Pulmonary artery. Aorta none. Apex none. |
| | 24 | Pulmonary artery and aorta loud. Apex soft. |
| | 26 | Same sounds generally. Venous murmur. |
| | 44 | Sounds generally indistinct. |
| | 54 | No morbid sounds audible, but reproducible on exciting the circulation. |
| 16 Allen Avery, 13, acute rheumatism. 42 days. | 1 | Base faint. Apex none. |
| | 3 | Do. Do. |
| | 6 | Do. Apex faint. |
| | 7 | Do. Do. |
| | 8 | Pulm. louder than aorta. Apex faint. No venous murmur. |
| | 10 | Base less definite. Apex. |
| | 12 | Murmurs generally faint. |
| | 13 | Pulm. artery louder than aorta. Apex faint. No venous murmur. |
| | 15 | Pulm. art. Aorta none? Apex none. No ven. mur. |
| | 20 | Do. Do? Apex none? Ven. mur. |
| | 22 | Do. Do? Apex none. No ven. mur. |
| | 27 | Base only on exertion. Apex none. |
| | 30 | Base. Apex none? |
| | 37 | Base none? Apex none. Venous murmur. |
| | 42 | Base none. Apex none? Do. loud. |

It will be seen on examination of these cases that in only 7 out of the 16 were all the murmurs finally removed at the time when the patients passed from under our observation. These are the first seven.

In the eighth case all the murmurs had at one time disappeared, but on her discharge from the hospital she, as well as the next case, presented a murmur in the pulmonary artery, and in this situation only.

In the four next cases (10, 11, 12, 13,) there was a murmur audible at the apex as well as in the pulmonary artery; in the 14th a murmur continued in the aorta as well as in the pulmonary artery; in the 15th a murmur could be heard on exciting the circulation at apex and base, in the pulmonary artery and in the aorta; in the 16th it is quite a question whether there was any cardiac murmurs at all; if so, only at the apex.

So that of the murmurs which continued we have

| | | |
|---|---|---|
| In 2 cases murmurs in | pulmonary artery only, . | 8, 9. |
| 4 | pulmonary artery and at apex, | 10, 11, 12, 13. |
| 1 case | pulmonary artery and aorta, | 14. |
| 1 | pulm. artery, aorta, and apex, | 15. |
| 1 | apex only, . . | 16. |

Of the murmurs removed we have to notice their disappearance,

| | | |
|---|---|---|
| In 8 cases from | pulmonary artery, | 1, 2, 3, 4, 5, 6, 7, 16. |
| 9 | apex, . | 2, 3, 5, 6, 7, 8, 12, 14, 15. |
| 11 | aorta, . | 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16. |

And contrasting this with the individual murmurs which remained, namely,

| | | |
|---|---|---|
| In 8 cases in | pulmonary artery, | 8, 9, 10, 11, 12, 13, 14, 15. |
| 6 | apex, | 10, 11, 12, 13, 15, 16. |
| 2 | aorta, | 14, 15. |

we may draw the conclusion, that murmurs in the pulmonary artery take a longer time for their removal than murmurs at the apex, and these than murmurs in the aorta. But it would be hazardous to attempt to draw any further inferences from such small numbers, as any subdivisions of these cases afford, and all that remains to be said on the numerical analysis of this subject will best be deferred till after the consideration of the remaining cases.

The second series contains those cases which presented a murmur in the pulmonary artery, together with other murmurs in the region of the heart, but of which none were removed so long as the patients continued under observation.

| | | |
|---|---|---|
| 17 Harriet Smith, 23, acute rheum. 11 days. | 1 | Pulm. art. louder than aorta. Apex. Vena. mur. |
| | 2 | Pulm. art. loud, ringing. Aorta sharp, blowing. Apex. |
| | 5 | Pulm. art. Aorta. Apex. (Soft, blowing in all.) |
| | 11 | Pulmonary artery louder than aorta. Apex. |
| 18 Eliza Martin, acute rheum. 55 days. | 1 | Base louder than apex. |
| | 7 | Same sounds generally. |
| | 23 | Base. Carotids. Apex. |
| | 28 | Pulm. artery musical. Right lung blowing. Left lung musical. Aorta and carotids blowing. Apex musical. |
| | 35 | Base and apex. Sawing murmur. |
| | 39 | Pulm. art. (Aorta faint?) Apex not examined? |
| | 55 | Pulmonary artery. Aorta faint. Apex. |
| 19 Mary Wolff, 21, acute rheumatism. 57 days | 1 | Base. Apex. |
| | 2 | Pulm. art. Aorta. Apex. |
| | 5 | Do. do. do. audible to left of mamma. |
| | 7 | Same auscultation generally. Sounds fainter. |
| | 8 | |
| | 9 | |
| | 10 | Sounds louder. |
| | 14 | Pulmonary artery. Aorta. Apex. Venous mur. |
| | 22 | Same auscultation. |
| | 26 | Same auscultation, but venous murmur very loud. |
| | 33 | Same auscultation as last note. |

| | | |
|---|---|---|
| | 40 | Pulmonary art. soft and blowing. Aorta loud and harsh. Apex louder. Venous mur. humming. |
| | 47 | Pulm. art. louder than aorta. Apex. Vena mur. |
| | 57 | Base less distinct. Apex. Venous murmur. |
| 20 Sarah Emmett, 13, acute rheum. 76 days. | 1 | Base none. Apex. |
| | 2 | Base. Apex harsher. |
| | 3 | Pul. art. (masked by a friction sound.) Aor. Apex. |
| | 4 | Base as yesterday. Apex. |
| | 5 | Do. do. |
| | 6 | Do. do. |
| | 10 | Do. 2d sound dull, do. |
| | 12 | Base indistinct do. |
| | 23 | Base. Apex. |
| | 26 | Do. do. |
| | 29 | Pulmonary artery. Aorta. Apex. |
| | 32 | Do. do. do. |
| | 38 | Do. do. do. Venous mur. |
| | 45 | Do. do. do. do. |
| | 46 | Pul. artery louder than aorta. do. do. |
| | 52 | Do. do. do. |
| | 59 | Pulm. art. Aorta faint. Apex loud. do. |
| | 66 | Pulm. artery. Aorta. Apex. Venous mur. faint. |
| | 76 | Pul. art. louder than aort. Apex. Ven. mur. faint. |
| After three months | | Base confused. Apex loud and harsh. |
| 21 Harriet Guy, 16, acute rheumat. 11 days. | 1 | Pulmonary artery faint. Aorta loud. Apex. |
| | 3 | Pulmonary artery louder than aorta. Apex. |
| | 4 | Pulmonary artery blowing. Apex ringing. (No murmur?) Apex. |
| | 11 | Pulmonary artery and aorta equally faint. Apex. |
| 22 Ann Guy, 28, subacute rheum. 16 days. | 1 | Pulmonary artery louder than aorta. |
| | 16 | Pulmonary artery. Aorta. (Carotids?) Apex. |
| 23 Mailsant Mayo, 10, acute rheum. enlarged abdom. 16 days. | 1 | Right lung behind louder than left. Base. Carotids. Apex louder than base. |
| | 3 | Pulm. art. louder than aorta. Apex not examined. |
| | 8<br>16 | Same auscultation, (murmurs at apex presumed to be unchanged.) |
| 24 Christiana Dawson, 22, effects of old rheumatism. 18 days. | 1 | Pulm. artery less loud than aorta. Apex blowing, and systolic to right of mamma, musical and diastolic to left of mamma. |
| | 7 | Same sounds generally. |
| | 18 | Same sounds generally. |
| 25 Sarah Butterworth, 25, acute rheumat. 6 days. | 1 | Pulmonary artery. Apex none. |
| | 2 | Pulmonary artery. Apex none. |
| | 4 | Pulmonary artery faint. |
| | 6 | Pulmonary artery louder than aorta |
| 26 Eliz. Harrington, 19, menorrhagia. 16 days. | 1 | Pulmonary artery. Aorta. Venous murmur. |
| | 16 | Pulmonary artery. Aorta. Musical venous murmur in innominata veins. Apex none. |
| 27 Eliz. Baker, 19, amenorrhœa. 2 days. | 1 | Base. |
| | 2 | Pul. art. Aorta. Carotids. No venous murmur. |
| 28 Ellen Fresbee, 19, amenorrhœa, 18 days. | 1 | Pulmonary artery. Aorta none. |
| | 14 | No murmurs at base clearly distinguishable. |
| | 18 | Pulmonary artery. Aorta. |
| 29 W. Ploughman, 17, eryth. nodosum. 26 days. | 1 | Aorta? Corotids. Apex. |
| | 12 | Pulmonary artery. Aorta none. Apex. |
| | 26 | Pulmonary artery. Apex. |

| | | | |
|---|---|---|---|
| 30 Mary Ward, 17, acute rheumat. 12 days. | 1 | | Base none. Apex. |
| | 2 | | Base none. Apex fainter. |
| | 3 | | Pulmonary artery. Apex. |
| | 5 | Vague | Simple murmur in left part of the cardiac region. Carotids. |
| | 8 | | Musical murmur in region of the heart. |
| | 12 | | Simple blowing murmur in do. |
| | | | Other murmurs, as not noticed to have altered, are presumed to have remained. |
| 31 Harriet Knight, 27, amenorrhœa. 40 days about. | 1 | | Pulmonary artery. |
| | 26 | | Pulmonary artery loud and blowing. Aorta faint, less blowing. |
| | 40 | | Murmurs at base remain, but indistinct. |
| 32 Maria Gall, 23, anæmia. 7 days. | 1 | | Pulmonary artery. Aorta none. |
| | 2 | | Base short, harsh, but fainter, not easily definable. |
| | 4 | | Same sounds generally. |
| | 7 | | Sounds generally continue, softer. |

It may be worth while briefly to run over these sixteen cases in the same manner as the former series. The murmur, by the nature of the case, remained in the pulmonary artery in all. Eight (namely, 17, 18, 19, 20, 21, 22, 23, 24,) presented also a murmur at the apex and in the aorta; four presented one in the aorta as well as the pulmonary artery, (namely, 25, 26, 27, 28,); in two, the apex and pulmonary artery were the situations in which murmurs were audible (29, 30,); and in two (31, 32,) the murmurs were so faint that no accurate description could be given of their situations.

For reasons already stated it would be unfair to draw any conclusions as to the comparative frequency of different murmurs, from these thirty-two cases; but there is a point of considerable interest in connection with this subject that they may serve to illustrate, which is, the date of the commencement of the murmur in the pulmonary artery compared with that of any other murmur arising during the progress of the case.

The murmur in the pulmonary artery was the first to be developed in four (namely, 25, 28, 31, 32). In none of these did a murmur subsequently develope itself at the apex. In truth, they were slight cases. Again in three (5, 11, 15,) the murmur was heard at the base of the heart for some days before it could clearly be made out in the pulmonary artery, in which, indeed, there was reason to suppose that the murmur did not exist in this artery.

In five cases a murmur appeared at the apex (10, 12, 20, 29, 30,) before it was detected at the base at all.

In the remainder, comprising 20 cases, (1, 2, 3, 4, 6, 7, 8, 9, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27,) the murmur in the pulmonary artery was either the only murmur developed at all, (as may have happened in case 1,) or else was developed simultaneously with murmurs in other parts, which, for the present purpose, it is needless to particularise; or lastly, (as in cases 2, 16,) though the murmur could not be defined to be in the pulmonary artery just at first, yet the result of examination, when the murmur had become louder, gave reason to believe that the sound was audible in that situation, not from change of place, but from increased intensity merely. It appears, then, that in the 12 cases which give any means of judging, the murmur was developed in the pulmonary artery first in 4 or one-third. To this we shall have occasion again to refer.*

The cases on which these observations were made may be divided, in respect to their nature generally, under two heads. Omitting mention of three cases which do not readily fall under either of the proposed subdivisions, namely, one of rubeola 9, of fever 14, and of the effects of old rheumatism mixed up with present functional disturbances (24,) (33,) (34,) we shall have 29 cases remaining for this investigation. They fall easily enough under the two heads of rheumatism and anæmia, and its kindred maladies.

| | | |
|---|---|---|
| Rheumatism, | 1, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 30, | =21 |
| Anæmia, &c. | 2, 3, 23, 24, 25, 26, 28, 29, | = 8 |
| | | 29 |

Of the anæmic cases but one opinion can be entertained that the murmurs audible in their hearts would some time or other altogether cease. Indeed in two (2, 3,) the murmurs were fairly watched out. In six the murmurs continued (26, 27, 28, 29, 31, 32,) after an observation of about 18 days. On the average, the other two gave no murmur on auscultation after about 11 days.

The examination of the cases of rheumatism is of far greater interest. Of these cases there are 21, of which 12 had murmurs removed, and 9 had no murmurs removed. Of the 12, 5 (1, 4, 5, 6, 7) had all the murmurs entirely removed, and the observation extended over spaces of 14 days, 2 years, 52 days, 64 days, and one year respectively. Of the 16 now remaining, the average length of observation was nearly the same in the 2 classes into which they may be divided, namely, in the 7 who had murmurs removed (8, 10, 11, 12, 13, 15, 16,) about† 29 days; in the 9 where no murmurs were removed (17, 18, 19, 20, 21, 22, 23, 25, 30) about 28 days.

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* We would claim some higher consideration for the tables than that of merely serving as a basis for the above calculations. In the collection of the cases we were guided by a sincere desire to understand the meaning of the often recurring sound. To their careful examination we invite the reader, as the best proof that that desire of reaching the truth at last was never lost sight of among the varying phases which any single case might present. Should the few next years furnish us with facts sufficient to contradict these, we will not fail to acknowledge our error. At present we are sure that these are facts, which as yet time only augments, and we cannot, if we would, resist the conclusions which they have forced upon us.

† This average is too low for the actual state of things as registered in the tables,

From these facts the following inferences seem naturally to arise. *First*, that a murmur may be heard in the pulmonary artery in many cases of anæmia and its kindred maladies, as also in acute rheumatism, which murmur, there are good reasons for concluding, not to arise from organic disease, as well on account of the variable nature of the murmur itself, as most conclusively on account of the rarity of disease of the pulmonary valves.

The *second* inference is, that the existence of a murmur in the pulmonary artery gives grounds, in some cases, for presuming that murmurs audible elsewhere in the same heart will disappear; in fact, that they do not depend on organic lesion of the valves to which they are referred. This statement will need a little farther exposition. And, *first*, as to the cause of murmurs generally. If they are not owing to organic changes, to what are they to be referred?

Whatever be the cause of the murmur being produced, the way in which the cause acts is by setting the blood in a state of vibration. The tones thus produced, whether in the blood-vessels or the blood itself, constitute, in all its varieties, what we call a murmur. And just as a wire may be fixed so as to vibrate on the least impulse, and continue long in that state of vibration, or to require a strong and frequently-repeated impulse to establish and maintain that state; so is it with fluids, and, what concerns us more immediately here, with the blood. The mere propulsion of this fluid from the ventricles into the large vessels, and its movement along the vessels, arteries, or veins, may suffice in some cases to set it in vibration,—to produce, in fact, a murmur. And this happens, as well shown by Andral,* especially in those cases where the blood is of extreme tenuity. In other cases, the blood requires more violent disturbance to throw it into vibration, such as is effected by the projection of a rigid valve into the stream, or by the sudden regurgitation of part of the stream, as in the case of imperfect closure of the aortic valves. Here, then, are the two cases;—the attenuated blood vibrating from a common cause, insufficient to affect healthy blood; and blood of a normal density vibrating from a superadded cause.†

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but the addition of a period of five months to the observation of case 13, (26), though it represents that case correctly as regards the observations that were made, probably does not fairly represent the actual state of the case, as the murmur may have disappeared months before during his absence from the hospital in the interval. While, therefore, we reckon this case as one where a murmur was removed, we are compelled to underrate the time required for its removal, and thus deprive ourselves, in some degree, of the pleasure of showing that a little longer observation would have in all probability altered the position of some cases from the second into the first class.

* Hæmatologia, pp. 52, 54. See also on this subject a paper by M. La Harpe.

† Archives Generales de Medecine, Aout, 1838, Pt. iii.

Insisting on the fact of the pulmonary valves being generally free from disease, murmurs referred to this situation must be explained on some other supposition than that of structural change. On the exact mode of production of this vibration there is no space here to speculate. The peculiar theory which any one may advocate is a step anterior to that with which we would commence, namely, the audible effect of these causes, whatever they may be assumed to be. We may suppose the ventricle to be contracting with unusual force, with unusual rapidity, to be temporarily, (for the variable nature of the murmur will not let us suppose it permanently), dilated, or affected in any way so as to throw the blood into greater vibration; or the blood itself may, by its tenuity, be more susceptible of vibration. There may be any cause but permanent structural change in action.

But before applying these conclusions to the other orifices of the heart, we must again refer to the table of cases, for we can apply them safely only under certain restrictions. It has been already noticed that the murmurs did not begin at the same time at all the situations at which it was eventually audible. In the majority the murmur began at the same time in more than one situation, and so far this is favourable. For if a murmur arises in any part of the heart except at the pulmonary orifice during acute rheumatism, and subsequently a murmur appears at this latter situation, we must look on that case in a less favourable point of view than what we would on a case in which they were all developed simultaneously; and this will be the more necessary, if, in addition to the attenuating effects of rheumatism on the blood, (which reduces its solids in the same way, though not to so great an extent, on the average as does chlorosis,)* venesection,† which produces analogous effects on this fluid, have been employed.

With this restriction we may apply what has been said of the pulmonary orifice, to the other orifices of the heart. It is *possible* that the murmurs heard in other parts of the cardiac region may have their origin in the same or similar functional disturbances in which it is *probable*, nay, almost certain, that the murmurs of the pulmonary artery take theirs. On this question, or recurring to the words of our second inference, what grounds there are for presuming that a murmur co-existent with one in, but referred to any other situation than, the pulmonary artery, may ultimately disappear, the above tables may throw some light.

It is true that of the first sixteen cases only seven had all the

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* Simon, Medizinischen Chemie, ii. 175, 208.

| | Solids. | Fluid. |
|---|---|---|
| Healthy standard, - - - - | 210 | 790 |
| Rheumatic blood, average, - | 194 | 806 |
| Chlorotic do. do. - | 172 | 827 |

† Hope, op. cit. p. 100 and p. 106. M. Hall, Med. Chir. Trans. xvii. p. 270, et seq. G. O. Rees, Med. Gaz. vol. xxxv. p. 849.

murmurs fairly watched out, (the phrase accurately expresses the process,) but in the whole of them changes were witnessed in the murmurs, and chiefly in those murmurs which, judging from their situation, were less likely to prove of a functional origin than those in the pulmonary artery. Let us look at the recorded auscultations of any cases which have been watched for a considerable time, till death has given an opportunity of confirming the diagnosis of valvular disease. The murmur on which the diagnosis was founded may have varied in intensity, it may have varied in character, from a musical have become a blowing sound, or the reverse, but it will never be found to have varied in situation. It may perhaps have been inaudible in its own situation, owing to a tranquil state of the circulation, but never will it be found to have left its own, and taken up, so to say, a new position.

It cannot be too strongly urged, for on this fact all the practice of auscultation is based, that each valve is a distinct centre of disease, and that the signs of the disease of each valve show themselves at particular places. If a murmur is heard one day at the apex, another day at the base, and another not at all, or perhaps at both places, clearly, considered in themselves, these murmurs are to be looked upon in quite a different light from one which is always referred to the same situation. May be they are all alike functional, but they cannot all depend on structural changes of the valves. Such can only be the case with the stationary murmur. And if, of these variable murmurs, one may be exchanged for another, why may not both be simultaneously removed? And if, of more murmurs than one in the same heart, one be manifested in the pulmonary artery, and be almost to a certainty independent of structural change; is it not at least possible that the murmur at the apex, or that in the aorta may be produced by the same or a similar cause to that in the pulmonary artery. The existence of a murmur in this artery shows that there is a cause in operation, independent of organic disease, sufficient to produce a murmur, and gives *some* grounds for presuming a functional origin even of such murmurs as have not yet by their variations already declared the nature of the cause which has produced them.

It is not without the fullest sense of the frequency of heart affection in acute rheumatism, that we venture on these remarks. To one conversant with hospital practice it will be unnecessary to apologize for almost complete ignorance as to what ultimately becomes of those who are discharged with the symptoms of heart disease after acute rheumatism. Enough if we have grounds for a hope, where our real information could give us no expectation, of the ultimate recovery of some portion of them.

It would be wandering too far from the proper subject of this essay to do more than point out generally why the subjects of acute rheumatism should be particularly liable to functional murmurs of the heart, or to collect authorities who have doubted the frequency of heart disease as a consequence of such affection. For after all, we have to deal with single and acute cases, to which general rules are rarely applicable, and, I fear, even on the authority of Chomel,* to encourage a doubt, in a single case where a murmur is heard, of deposition of lymph on the valves, when the time for cure is so short, the consequences so terrible, and the deposition of lymph, to all demonstration, so frequent.

Perhaps, too, after all, this murmur in the pulmonary artery may seem trivial, but as the characters that distinguish organic from functional murmurs are to be sought in the variable nature of the latter, and the recognition of this pulmonary murmur gives a means of distinguishing a difference where we should have presumed an identity; further, as murmurs are more commonly heard at the base than at the apex of the heart, and consequently assistance in this quarter is so much more valuable for diagnosis; lastly, as the murmur in the pulmonary artery, as already shown, generally outlives all the rest, therefore, as in the most important particular, in the greater proportion of cases, and at an earlier period, information can be drawn from this sign; that surely cannot be trivial to appreciate which nothing more than common tact, than common industry are required.

Our means of diagnosis between functional and organic murmurs of the heart are derived from numerous sources; but it is rather from the meaning of them all together than from the import of any one singly, that we draw our conclusions. That the general symptoms diagnostic of functional affections of the heart have not been here spoken of, must not in any way be considered as a proof that we underrate them. The above remarks have been confined to the physical diagnosis, though a more generally interesting, and perhaps a more useful essay might have been written on the means of diagnosis which the constitutional symptoms offer, for indeed they are many enough and variable enough to require a long exposition. The present diagnostic character is put forwards, not as demanding exclusive attention, nor disparagingly of the information supplied by other symptoms, but merely as one other sign; its existence we have endeavoured to show, and the field in which it may be useful, not as sufficient always whereon to found a diagnosis, but at least as valuable as many on the grounds of which we are in the daily habit of presuming, and by its presence confirmatory where not conclusive for a favourable, rarely, if ever, for an unfavourable prognosis.

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* Chomel sur le Rheumatisme, p. 297. The comparatively greater frequency of base than of apex murmurs must be a fact familiar to auscultators. But the traces of endocarditis are more common on the mitral than the aortic valves. (Rokitansky, Pathologie, i. 439.) The difference must therefore be set down to some other cause than permanent organic affection of the valves, arising from endocarditis.

# PART II.

## CRITICAL ANALYSIS.

Art. I.—*Friedrich Tiedemann, Von der Verengung und Schliessung der Pulsadern in Krankheiten. Mit Drei Tafeln.* Heidelberg und Leipzig, 1843. 4to. Seirte 316.

*On Arctation and Closure of the Arteries in Diseases.* By Frederick Tiedemann, Professor of Anatomy and Physiology at Heidelberg. With 3 Plates. Heidelberg and Leipzig, 1843.

The great function of the arteries in conveying blood to the different regions and organs of the body, and thereby maintaining their nutrition, their vigour, and their energy, is on the whole so clearly understood, that it appears almost obvious, in contemplating the origin, the course, and the distribution of these vessels. Since the time of Hàrvey it has been universally admitted, that the blood flows from the heart to the aorta, and the large trunks into which it is divided, from the trunks to the branches, and from the branches to the smallest twigs and ramifications, until it is dispersed through a thousand minute 'capillary channels into the substance of the organs and textures of the animal frame.

To the proper and regular performance of this function, however, two conditions are necessary; namely, the integrity of the arterial walls, and the perviousness of the arterial channels. And as the necessity of these conditions is at once urgent and perpetual, it is reasonable to expect, that if by any means they are impaired, the function would be thereby impeded, suspended, or interrupted, and serious evils would be the result. If it be admitted that the circulation of the blood in a regular, steady, and uniform manner be necessary to the well-being of the system at large, and to that of its individual parts, then must it follow that any cause or causes by which this uniform and regular motion from trunks to branches is interrupted or impeded, would be attended with the worst effects on the parts concerned, and probably very considerable disorder in the whole system.

These inferences, deduced from anatomical facts and physiological considerations, we find, on the whole, to be within certain limits well founded, and to be confirmed by actual experience. It has been ascertained that the arteries, though so necessary to the well-being of the system, are liable to become obstructed from various causes; that this obstruction is followed by very detrimental effects to the parts supplied by the obstructed vessels; and that, though the arterial system possesses in its arrangement and distribution, certain conservative powers, by which these detrimental effects may be in some degree counteracted, and for some time averted, yet the obstruction, either directly by itself, or indirectly by its effects, always determines the destruction of the part most immediately supplied by the diseased vessel, and very commonly of the whole system.

These facts may be regarded as established by the concurrent evidence of Scarpa, Cooper, Hodgson, Guthrie, Breschet, Porter, and other writers on the diseases of arteries. Yet are they only corollaries, as it were, resulting from the facts adduced and the principles established by these authors. By scarcely any one has obstruction of the arteries been considered in its physiological and pathological relations in a systematic manner; and though many examples of the lesion are dispersed through the writings of the authors now referred to and periodical works, yet no attempt was made to collect and arrange any of these cases until the year 1828, when the late Mr John W. Turner read before the Medico-Chirurgical Society of this place an Essay on the Sudden Spontaneous Obstruction of the Canals of the larger Arteries of the Body, with observations on the process employed by nature to prevent or arrest hemorrhage from lacerated arteries. This essay, which, with a supplement, was published in 1829,* contains a series of examples of obstruction in different arteries, and is the first attempt to give a general view of the lesion, to discover its causes, and to explain their effects.

The essay of Mr Turner appears to have been written chiefly with a view to ascertain and explain the means employed in arresting hemorrhage in the case of lacerated arteries.

One class of cases Mr Turner had considered only partially, though with much acuteness. We allude to those in which the canal of the aorta is contracted or obliterated; and at that time, perhaps, the cases known were too few to justify any very positive conclusions. In the year 1841 an attempt was made to consider systematically this order of cases in a memoir published in the fifty-sixth volume of this Journal, in which, with one new case observed by the author, histories were given of all the other authentic cases on record. It was chiefly with a view to elucidate the nature of one form of obstruction or obliteration that the memoir referred to was written; and the author, in his desire to confine himself to that particular form of obstruction, excluded, in a great degree, the consideration of those cases, an account of which would have been requisite in a complete view of obstructions of the arterial system at large.*

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* Transactions of the Medico-Chirurgical Society in Edinburgh, Vol. iii. p. 105 and 308. Edin. 1829.

In the present work by Professor Tiedemann of Heidelberg a more extended view of the various forms of this lesion is taken; and the author has given not only those cases which have fallen under his own observation, but has, with great labour and diligence, collected all the cases hitherto recorded in the writings of physicians and surgeons who have in any way considered this subject. This series of cases, arranged as we shall speedily have occasion to show, constitutes the first part of the work.

In the second part, which occupies nearly two-thirds of the volume, the author draws, from the facts given in the first part, the inferences and conclusions warranted, and delivers all those general observations which may elucidate the nature, origin, and effects of obstructions, the means of recognising their existence, and the measures which the medical attendant may employ, with the hope of affording relief and abating suffering.

The first division of the work, comprehending the cases and observations, consists of two sections, in the first of which are detailed eleven instances of arctation, occlusion, or obstruction of arteries which have fallen under the observation of the author. The second section, which is subdivided into fourteen chapters, contains a classified detail of all those cases of occlusion, contraction, or obstruction, which have been recorded by different physicians and surgeons in all the countries of Europe where medicine is cultivated. As in the latter section the matter is evidently not new, and as many of the cases must be known, having appeared already either in this or other journals and in other publications, while the first section is the most original, we shall, in adverting to the cases, direct attention chiefly to those which Professor Tiedemann has published in this section.

1. *Occlusion of the superior mesenteric artery and of both superficial femoral arteries.*

Several years ago, the body of a man of 60 was brought to the anatomical theatre of Heidelberg. The only history that was obtained was, that he was admitted as a diseased wandering beggar into the hospital at Mannheim, where, a few days after admission, he died with symptoms of great debility.

As the body was emaciated, it was employed for injection and preparation of the arteries. The injection flowed well from the origin of the aorta to the superior mesenteric artery. Upon exposing the arteries of the abdomen, the trunk of the superior mesenteric artery was seen from its origin from the aorta, to be completely closed for the space of fifteen lines, adherent in its walls, and converted into a thin ligamentous chord, exactly as it is usual to find arteries which have been enclosed in a ligature. All the branches and twigs nevertheless of the vessel, below the closed spot, were filled with the matter of the injection. The lower pancreato-duodenal artery rising beneath the occluded vessel was very much enlarged. After giving off branches to the head of the pancreas and the duodenum, it formed with the superior pancreato-duodenal artery from the hepatic artery a large arch-like anastomosis. The trunk of this vessel was in like manner dilated, and its circumference was greater than that of the splenic artery. By these anastomosing branches the injection had been impelled from the hepatic artery into the trunk of the superior mesenteric artery below the point of closure; and by this channel also during life must the blood have flowed to the arteries of the jejunum. At the transverse arch of the colon the large anastomotic artery, from the inferior mesenteric artery, was in like manner much enlarged. This formed a second path by which the blood of the superior mesenteric artery and its branches was conveyed to the jejunum. The action of the blood, accordingly, on the jejunum could only have taken place, the Professor infers, through those dilated anastomosing lower and lateral branches, as in a limb, the arterial trunk of which had been tied.

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* Instance of Obliteration of the Aorta beyond the Arch, illustrated by similar cases and observations. By David Craigie, M. D. &c. Edin. Med. and Surgical Journal, Vol. lvi. p. 427.

The obliterated portions at the origin of the superior mesenteric artery were internally accurately adherent, and the coats of the artery were neither thickened nor contained any trace of earthy concretion. They resembled exactly the ligamentous chord of an artery which has been made to unite by ligature. Neither could it be imagined that any rash surgeon might have, during the life of the person, applied a ligature to the trunk of the superior mesenteric artery; for it did not appear, that there could be any object in such operation, in so far as no trace of any aneurismal sac in the abdomen was found. The closure of the artery must therefore have been the effect of adhesion from internal causes or a morbid state. In the further exposition of the branches proceeding from the aorta nothing unusual was observed, except that the arch of the aorta was occupied by earthy concretions or ossified patches.

In preparing the arteries of the left lower extremity, it was found that the trunk of the superficial femoral artery, immediately after its origin, underwent a fusiform or spindle-like contraction, and then was completely closed through its whole course through the arch in the tendon of the adductor muscle to the ham, and was converted into a thin ligamentous chord. Immediately on entering the ham, however, the trunk was filled with injection. All the branches issuing from the popliteal artery, the superior, middle, and inferior articular arteries, and the branches going to the *gastrocnemii* muscles were injected. The branches of the popliteal artery also, the anterior and posterior tibial arteries, and the fibular artery with their ramifications to the foot, to the extremities of the toes, were also completely filled with injected matter.

Upon inquiring how the injection had gone from the common femoral artery into the popliteal artery and its branches, it was found that the deep femoral artery, (*profunda femoris*,) immediately after its origin from the common femoral, had a circumference as large again as usual. The external circumflex artery of the thigh rising from it was very much enlarged. Below the sartorius and rectus muscles it proceeded at first outwards, then wound to the inner side of the *femur*, and sank into the substance of the *internus femoris* muscle. By numerous anastomoses it formed a connection with the internal articular arteries. This was one channel by which the injected matter, and during life the blood, must have flowed from the deep femoral artery through the articular branches of the knee, into the popliteal artery. Secondly, the internal circumflex artery and the perforating branches of the deep femoral artery were much dilated, and communicated with the enlarged muscular branches of the popliteal artery. Further, round the posterior tibial nerve and the fibular nerve, crept large arterial twigs which anastomosed with branches of the popliteal artery. This was the second channel by which the injection, and during life the blood, had penetrated into the popliteal artery and its branches. And thus, concludes Professor Tiedemann, it may be understood how, in complete occlusion of the superficial femoral artery, blood, notwithstanding, was conveyed to the arteries of the lower part of the leg and the foot.

In preparing the arteries of the right lower extremity, the superficial femoral artery, exactly as in the left extremity, was likewise completely adherent and closed as far as the popliteal artery. But here also, notwithstanding, the popliteal artery and all its branches to the lower part of the leg and foot were completely filled with injection. All the anastomosing branches between the internal circumflex artery, the deep femoral artery and their branches, with those of the popliteal artery, were, as in the left leg, greatly dilated.

The obliteration of the superficial femoral trunk in both lower extremities, he maintains, must in like manner have been accomplished by internal causes, or a morbid state of the arteries, and could not be the consequence of any ligature applied during life. This is proved by the fact, that on the skin of the thigh there was no scar of any previous wound, and that in none of the arteries of the thigh or leg was there any remains of any aneurismal sac.

The adhesive union of these arterial trunks, and the enlargement of their anastomotic lateral branches, must further have taken place a considerable time previous to the death of the patient. In proof of this, it may be observed, that, in the walls of the iliac and the deep femoral artery, as also of the anterior and posterior tibial and the fibular arteries, were observed many earthy concretions or ossific patches, while of these no trace was found in the obliterated femoral arteries. These must also have taken place subsequent to the adhesive obliteration, because otherwise the great dilatation of the collateral vessels, after the obliteration of the superficial femoral arteries, must have been impossible. The causes of the total occlusion and adhesion of the trunk of the superior mesenteric artery and of both superficial femoral arteries, can consequently be sought only in adhesive inflammation of the inner coat of these arteries, which had taken place long before the death of the patient.

2. *Occlusion of the left axillary and humeral artery in gangrene of the hand and fore-arm.*

This case, which took place in the academical hospital at Tubingen, Professor Hermann had the kindness to communicate to the author.

A day-labourer, 56 years of age, the father of six healthy children, had enjoyed good health till the last two years. Without known cause, on the right side of the chest arose a swelling, which proceeded to suppuration, and left a fistulous opening scantily discharging purulent matter. In March 1840 he was all at once attacked with pain in the left arm, which was at first trifling, but progressively became more violent. Some time after, the index finger of the left hand became black, and speedily after, the other fingers. Swelling attacked the hand and extended to the fore-arm. On the 23d of June the patient requested assistance at the surgical clinical establishment of Tubingen. The left hand was then greatly swelled; the swelling was soft; the skin cold and insensible; and on the posterior surface were black spots and vesications. The dirty livid marbled appearance extended nearly to the elbow. No symptoms of inflammatory reaction were observed. Though the shoulder was not swelled nor the skin livid, yet no pulsation could be felt in the humeral or in the axillary artery; and in their course was felt only a hard chord.

It was here thought that the gangrene might proceed from closure of the humeral artery. But there were no means of determining how far the occlusion extended towards the heart. In the appearance of the parts attacked, limitation of the gangrene was in no manner to be expected. As the soft parts of the humerus appeared still sound, it was resolved to make an attempt to set limits to the gangrene, by amputation of the humerus. Professor Riecke performed the operation; and though pain was felt, no bleeding occurred. The humeral artery was completely closed by a solid fibrinous clot; all its branches were obliterated and gave no blood; and no pulsating motion was observed in them. A simple bandage moistened with chamomile infusion was applied. Musk was given internally.

On the 5th of June the wound was gangrenous; the strength of the patient rapidly sunk, and he died on the 9th of June.

On dissection, the subclavian and axillary arteries with all their branches and twigs were found completely closed by solid fibrinous coagula, which adhered closely to the inner coat of the arteries. The plug of fibrinous coagulum extended into the left subclavian artery to about one inch from its origin from the aorta. Here it terminated somewhat abruptly; yet loose patch-like shreds of coagulable lymph were attached to the inner coat of the vessel as far as the aorta. The aorta presented many hard cartilaginous spots, containing plates of bone, partly denuded of the inner serous membrane, which felt rough.

The gangrene and the pulselessness of the arm were evidently the consequence of the occlusion of the axillary and subclavian artery by solid fibrinous coagulum, which had extended into the branches and twigs; and as they were closely attached to the inner surface of the artery, must have been a product of inflammation. Under these circumstances no supply of blood could be transmitted to the lower branches and their anastomotic communications.

3. *Closure of the lower part of the left humeral artery.*

Several years ago Professor Tiedemann prepared the injected arteries in the body of a man of thirty years, which, without any history, had been brought from the house of correction at Mannheim to the anatomical establishment at Heidelberg.

In the left arm the author found the lower part of the humeral artery at the bend of the arm, for the length of two inches, completely obstructed. From the spindle-shaped apex of the upper end of the artery proceeded a small serpentine twig, which was connected with the opposite end. This contained injection matter; and was probably a newly-formed vessel, such as those which Parry observed in sheep, between the ends of tied and divided carotid arteries.

The lateral branches of the humeral artery and their anastomoses with the recurrent branches of the radio-cubital and interosseal artery had evidently increased in circumference. By these was the blood during life conveyed to the forearm and the hand. The considerably enlarged collateral radial arteries communicated by many twigs with the recurrent branch of the radial artery and with branches from the recurrent of the interosseal. The collateral ulnar artery communicated with the recurrent branches of the ulnar artery.

He observed at the bend of the arm or its vicinity no trace of cicatrix, from which it might be inferred that during life a ligature had been applied to the humeral artery; and it must therefore be admitted that the complete closure of this portion of the artery was the result of internal causes.

The four following cases are less peculiar and of more common occurrence. They are instances of contraction or arctation of the orifice of the aorta, in consequence of a morbid state of the semilunar valves.

4. *Arctation of the orifice of the aorta, from mutual adhesion of the semilunar valves.*

A man of 40 years had long suffered under violent palpitation, irregular action of the heart, with weak and intermitting pulse, and great tightness in breathing. His sufferings he dated from an attack of *pericarditis*, under which, according to the account of his physician, he had laboured some years previously. After a violent mental affection he died suddenly; and the body was brought to the anatomical theatre.

Several ounces of serous fluid were collected within the pericardium. The heart, especially the left side, was enlarged. Its cavities were filled and distended with dark-red clots. The left chamber was somewhat enlarged, and its walls appeared hypertrophied. On opening the trunk of the aorta, the semilunar valves at their edges were occupied with many soft, reddish growths or excrescences mutually connected, which extended into the orifice of the aorta and manifestly contracted it. Similar growths, of the size of millet seeds, were found at the margins of the mitral valves. In the heart nothing unsound was observed.

5. *Contraction of the orifice of the aorta from thickening of the semilunar valves.*

In the body of an unmarried female of some 40 years of age, who had suffered from tumultuous palpitation, with symptoms of interrupted motion of the blood through the heart, violent breathlessness, great constriction and anxiety in the region of the heart, Professor Tiedemann found the heart enlarged; the semilunar valves whitish, opaque, thickened, and of gristly hardness. The orifice of the aorta had the shape of a narrow cleft. The left auricle was decidedly enlarged, and its walls were much thicker than usual. The two *laciniæ* of the mitral valve appeared much thickened, whitish, hardened, and rigid. The venous opening of the left ventricle was contracted. The walls of this ventricle were hypertrophied. Of the right auricle the circumference was large. The laciniæ of the tricuspid valve were in like manner thickened, and partly united with each other, by which the aperture leading into the right ventricle was in an evident degree contracted.

6. *Arctation of the orifice of the aorta from deposition of earthy concretion in the semilunar valves.*

A strong man, 56 years old, had been some years previously, in consequence of intense chilling, attacked with inflammation of the pericardium. Under the use of blood-letting, the application of leeches over the region of the heart, and antiphlogistic remedies, the inflammation was subdued. But from that time he was, on ascending an acclivity or steps, and in all corporeal exertions, attacked with violent beating of the heart. This became progressively more intense, and continued even when he was at rest, particularly if lying on the back. The heart beat over a large space; and in the systole there was heard a strong bellows murmur. The pulse was very frequent, small, weak, irregular, and often intermitted. The breathing was oppressed, and on violent muscular efforts symptoms of suffocation took place. The patient was attacked with general dropsy, and died with all the symptoms of contraction of the orifice of the aorta, from incompetency of the semilunar valves.

Inspection disclosed the following appearances. Much fluid was collected within the *pleuræ*, *peritonæum*, and the cellular tissue of the extremities. The pericardium was in several points attached to the heart by old adhesions, and contained some reddish serous fluid. The heart appeared enlarged in circumference; the right half was dilated, and the left auricle in particular. The walls of the auricle and the left ventricle were thickened. The mitral valve was very thick, whitish, and hard as gristle. The venous aperture was evidently contracted. The semilunar valves of the aorta appeared swelled, hard, and penetrated with deposits of calcareous matter, which rendered them stiff and inflexible. The orifice of the aorta was diminished to one-third part of its usual circumference.

"Calcareous concretions," says Professor Tiedemann, "in the valves of the aorta, and arctation of the aorta thereby induced, I have further many times met with in examining dead bodies; and they are among the most frequent morbid changes of the heart. I have uniformly seen the left ventricle more or less dilated thereby, and its walls hypertrophied. Occasionally also the left auricle is much distended, and its walls are thickened; and in that case the laciniæ of the mitral valve are at the same time thickened or contain earthy deposits; and the venous orifice of the aortic ventricle is also contracted."

7. *Contraction of the orifice of the aorta, from a circular or*

*annular chording of its walls and adhesion of the semilunar valves.*

A female in whom symptoms of disease of the heart had been long observed, though without anything more precise having been ascertained, died; and a physician carefully removed the heart and sent it for examination to the anatomical theatre, where it is still preserved.

The left auricle had a larger circumference than the author had occasion ever to see. It was much larger than three fists, which readily took place in its dilated thin-walled cavity. The orifice leading into the left ventricle was changed into a very narrow cleft about nine lines long. The laciniæ of the mitral valve were thickened and of cartilaginous hardness. The left ventricle was enlarged and somewhat hypertrophied. At the origin of the aorta was a circular contraction as if caused by the application of a ligature. The semilunar valves were altogether adherent with each other and shrivelled. By this the orifice of the aorta was so much contracted that it was not more than three lines in diameter. The arch of the aorta was narrower than usual, and its walls contained whitish hard spots.

The right auricle was so much dilated that it allowed the entrance of a large man's fist. The walls were attenuated. The trunk of the coronary vein had a circumference larger than that of the thumb. The right ventricle, the tricuspid valve, and the pulmonary artery with its semilunar valves, presented nothing abnormal.

The unusually large pouch-like distension of the left auricle, in which also the pulmonary veins had partaken, was manifestly, the author observes, a consequence of the great contraction of the venous aperture of the left ventricle. Through this the blood could not properly be propelled; it must have therefore accumulated in the left auricle; and distended its walls to so great a degree. The dilatation and hypertrophy of the left ventricle arose from the annular contraction of the aortic orifice, by the shrivelling of its walls, and the adhesion of the semilunar valves.

Contraction of the aortic orifice from chording, shrivelling, or contraction of the walls of the aorta at its origin, as if it had been produced by the application of a ligature, is a remarkable, but not less real condition. These changes the author observed in the year 1835, in three hearts preserved in the anatomical collection of the College of Surgeons at Dublin. These are described in the Catalogue 105, 104, 103.

Arctation of the aorta from chording, shrivelling, or contraction of its fibrous coat proceeds also, as is proved by observations more recently collected, from arctation and complete closure of its thoracic portion. This the author thinks is uniformly the consequence of inflammation of the coats of the aorta.

8. *Deposition, calcareous concretion in the walls of the coronary arteries of the heart, and, from arctation of its area, and closure thereby induced.*

Case 1.—A woman, 70 years of age, had for several years laboured under symptoms of *angina pectoris*, which arose in consequence of violent corporeal efforts or exciting mental emotions. The symptoms recurred after intervals always shorter, became more violent, and were attended with great loss of strength. In one of these fits death took place.

On dissection the heart was found unusually small, and beneath the pericardium much fat was deposited. Both coronary arteries were, from their origin at the aorta, converted into hard earthy canals. The orifice of the right coronary artery was so much contracted, that it scarcely admitted a small probe. Not only was the trunk of the artery in the circular furrow of the heart ossified, but the branches lying in the longitudinal furrow, and all the twigs penetrating the fleshy substance of the heart appeared hard and inflexible. The walls of the ascending aorta, the arch, and the thoracic portion contained in like manner many considerable calcareous concretions and atheromatous masses.

The heart, which was unusually small and atrophied, measured in the long diameter only two inches and seven lines, and in the transverse diameter two inches and four lines. It weighed two ounces three drachms. The walls were very thin, soft, and lacerable. No morbid changes were observed in the valves. The *columnæ carneæ* of the tricuspid valve were very thin and feeble.

Case 2.—In the body of a man 61 years of age, much addicted to the use of spirits, and who had suffered from frequent attacks of *angina pectoris*, and who, from *tædium vitæ*, had committed suicide by suspension, the author found the following appearances.

The heart was very small. Both coronary arteries were from their origin, and all the branches, twigs, and even small vessels between the fleshy bundles of the ventricles were ossified. The orifice of the right coronary artery was entirely closed. In the anterior wall of the outer or investing part of the pericardium appeared a flat thin piece of bone of the size of a one florin piece. The walls of the heart were unusually thin, soft, and flabby. None of the valves were morbidly changed, and the aorta contained no earthy concretions.

The author further found the coronary arteries of the heart in the bodies of four persons advanced in life ossified, and their canal evidently narrowed. In one subject the walls of the aorta also contained earthy deposits. In all the heart was very small, and its walls appeared atrophied, soft, and lacerable. In two of these persons symptoms of *angina* were wont to take place. Of the other two, who were wandering beggars, who died suddenly, and whose bodies were given to the theatre, no information could be obtained.

In all these cases also was the heart very small and atrophied, and its walls were thin and soft. In consequence of the contraction or entire closure of one of these vessels, the afflux of arterial blood to the substance of the heart must be rendered difficult, and thereby the nutrition of the organ must be impaired. This necessarily causes diminution of its powers.

9. *Contraction of the thoracic portion of the aorta to complete closure.*

This case took place in the person of an invalided soldier, 60 years of age, who in September 1828 had been admitted into the military hospital of Brunswick, on account of severe constriction in the chest, and died there after a few days. The preparation, with the history of the disease, was found in the collection of the late staff-surgeon Pockels, and was sent to the anatomical theatre at Brunswick. Professor Heusinger had the kindness to communicate to the author the history and the report of the dissection, and Dr Fasebeck sent him a drawing of the preparation.

This person was at the age of 17 already a soldier, and he had, in the French revolutionary war, served one campaign in the Netherlands. During his period of service he was much addicted to the use of spirits, and he had suffered from rheumatism, gout, itch, and syphilis. In the year 1799 his regiment had, in the return through Westphalia, often to march through water, by which he was much chilled, and they nevertheless continued the march to Brunswick. Some days after his arrival there, his feet swelled; then the abdomen, the arms, and the face; and general dropsy was established. As the patient was treated for four months without avail, he was discharged with a pension. He then came under the care of a veterinary surgeon, who, by means of strong purgative and diuretic agents, delivered him from the dropsy in the course of four weeks. After this time he worked as a day labourer, or, as a pedlar, frequented the market. But he led a very irregular life, drank much brandy, and was often intoxicated, so that he became a pale emaciated figure. By the persuasion of his wife and family he gave up the use of brandy, and after a temperate mode of life, continued strong, healthy, and fit for labour. Hitherto he mentioned that he had not suffered from palpitation.

In the year 1823 this man began, without known cause, to complain of the chest. He had dry cough, was short breathed, could no longer run or walk; to ascend steps was to him difficult. In bed he lay mostly on the right side, because the constriction in the chest was aggravated by lying on the left side. These complaints, the commencement of which he could not accurately define, progressively increased. On the left side there appeared an inguinal hernia, which greatly distended the scrotum, and to which he applied no bandage. He now gradually lost his original vigour, and became inactive and unfit for labour. He nevertheless complained not of pain in the chest, felt no palpitation and no anxiety. The appetite was also good, the alvine discharges were proper, and he followed his avocations so far as his strength allowed. The breathlessness, however, increased, especially when he exerted himself, ascended a stair, or lay on the left side. After harvest in 1827, œdematous swelling of the feet appeared, but did not prevent him from moving about, and was scarcely observable in the morning on rising. In the summer of 1828, his strength was much impaired, the feet were constantly swelled, he could make little exertion, and the appetite was gone. On the 28th September he was brought by his own desire to the military hospital.

The following was then his condition.

He was of middle size, of compact strong frame, and broad shouldered. His face was emaciated, pale, and dingy coloured. The lower extremities and the hands were œdematous. Water was also collected in the abdomen. The breathing was very laborious and confined, with elevation of the shoulders, and strong action of the abdominal muscles, while the thoracic cavity was not sensibly dilated. On percussion of the chest, the sound on both sides was normal above; below it was dull; the carotid arteries beat violently; and strong pulsation was remarked above the collar bone. The action of the heart was normal; and the patient did not complain of palpitation. The number of the pulse at the wrist was from 100 to 110 in the minute. But the pulse was strikingly small and feeble, though not intermitting. The patient lay constantly on the right side, and when he turned to the left side or lay on the back, the breathlessness was increased.

The disease was considered to be dropsy of the chest, with ossification of the semilunar valves; and diuretic remedies were prescribed.

On the following day, the constriction of the chest was very much increased, especially in the erect position. The hands and feet were cold; the pulse was accelerated to 120 beats in the minute, and occasionally intermittent. The patient slipped into a soporose state; the breathing became very difficult; the pulse smaller and softer, and intermitted more frequently; and death took place on the 8th of October.

Next day the body was inspected anatomically.

On opening the abdomen, the epigastric arteries appeared unusually enlarged, and their walls ossified. The cavity contained about three pounds of clear yellowish serum. The stomach and intestinal canal, the liver, and spleen, presented nothing morbid.

Some folds of intestine were united by old false membranes, which probably had been formed about thirty years previously, when the patient was suffering under dropsy. In the hernial sac was a loop of intestine.

The cavity of the right pleura contained about six pounds of fluid, by which the lung was compressed. The right lung was by old false membrane united to the costal pleura. The substance of the lungs was solidified; the cells appeared shrunk; and a melanotic deposit had taken place in the superficial and inner layer of the lung. The cavity of the left pleura, in which was no water, the lungs filled completely; but they contained melanotic matter and serum in their cellular tissue.

On detaching the sternum the internal thoracic arteries appeared dilated to the size of the little finger, very serpentine in their whole course, and anastomosing with the enlarged lower epigastric arteries. Their walls contained osseous patches.

The heart was almost once again as large as a doubled fist; and its apex was rounded. The walls of the left ventricle were very thick and solid; the right ventricle was not hypertrophied. The arch of the aorta was much dilated. Below the origin of the left subclavian artery was found in the slit-up aorta, a sort of partition which almost entirely closed its canal. Above this the upper intercostal arteries, much enlarged, arose. On more accurate examination of this partition, which formed a chord in the arch of the aorta, there was observed a very small opening of the diameter of half a line. Through this the arch of the aorta was connected with the thoracic portion. The edges of the small opening were lacerated, and the partition consisted of solid matter which had the consistence of cartilage. The walls of the arch of the aorta were one line and a half thick. Below the partition the aorta, to its division into the iliac arteries, presented the usual circumference. The vessels rising from the arch, as the *innominata*, the left carotid and subclavian artery, were much enlarged, and the latter was dilated. Immediately below the dilatation was the chorded part with the partition. The intercostal arteries of both subclavians were enlarged to the diameter of three lines; and they formed many serpentine flexures and net-like plexuses. They anastomosed with the enlarged upper intercostal arteries which arose below the partition from the thoracic part of the aorta.

In this manner had the parts below the diaphragm received blood during life, partly by the superior and inferior intercostal branches, and these multiplied anastomoses enlarged to the highest degree, and partly by the unusually enlarged internal thoracic arteries of the two subclavians, and their anastomoses with the enlarged epigastric vessels.

As to the time at which this remarkable contraction and chording of the aortic trunk arose, the Professor infers that it must have taken place in 1799, when the individual was greatly chilled and was attacked with dropsy. With this had probably been associated violent inflammation of the pleura and peritoneum; for this inference may be drawn from the adhesions found in the costal and pulmonic pleura, and also the adhesions of several intestinal folds. It is reasonable to conjecture, the author argues, that in the inflammation of the pleura the adjoining aorta had participated, and that this inflammation might have given the first occasion to the narrowing and almost complete closure of the aorta, partly by the deposition of coagulable lymph within its canal, partly by the contraction of its fibrous coat. The arctation of the aorta first induced by the disorderly life of the patient, and the abundant use of brandy, had gradually acquired the cartilaginous hardness; and the aortic walls above the septum had in like manner been gradually thickened. That the arctation of the aorta, was of very early origin the author thinks appears clearly from the ossification which was observed in the walls of the greatly dilated thoracic and epigastric arteries.

It is remarkable, says the author, that in this chording of the aorta, no palpitation and no disturbed action of the heart should have been remarked, which, it is scarcely to be doubted, must have occurred during the first origin. Though of these the patient made no mention in the description of the history of his disease, yet the cause might be that after the lapse of twenty-nine years he no longer remembered them. Probably the inquiries were not sufficiently minute. It is less extraordinary that, at the first admission of the patient into the military hospital, no remarkable disturbance in the heart's action was observed. The reason was, that at this time the great enlargement of the lower vessels and their anastomoses were sufficient to maintain the circulation of the blood.

It is further remarkable, says the author, that the arctation of the aorta had little share in the final disease and death of the individual. This consisted in dropsy of the chest, induration, melanosis and dropsy of the lungs, and consequent debility. That to the patient lying on the left side and on the back was difficult, readily proceeded from this, that the degenerated lung and the right pleura filled with water, compressed behind and on the left the anastomosing intercostal arteries, and thus rendered the circulation difficult. From the history of the disease we cannot otherwise infer what peculiar state took place in the symptoms, when the patient tried to lie on the left side and on the back. No objection can be made to the physician on account of defective diagnosis, since he could have suspected nothing less than an almost complete obliteration of the aorta to be present. And it has subsequently happened in the observation of other distinguished physicians, that they have not recognised an arctation or closure of the aorta.

Doubtless we say it has happened; and it will happen again and again that physicians, even of considerable skill and experience, will fail to recognise the existence of obliteration or arctation of the aorta. The truth is that the lesion is not a very frequent one, and hence there are few opportunities of studying its symptoms beforehand; then it is quite clear that it may exist for a considerable time without causing any serious inconvenience or disorder in the action of the organs of auscultation, and consequently without giving rise to characteristic diagnostic symptoms; and lastly, when the fatal event takes place, that is owing rather to other lesions with which the arctation and obliteration are associated, than to the lesion itself.

Another observation we have still to make on this curious and remarkable case. It is here not in its right place. It is, every circumstance in its history concurs to show, one of those cases of obliteration at the definite spot of the aorta, formerly made the subject of consideration, and explained in the memoir by Dr Craigie in the fifty-sixth volume of this Journal. The obliteration did not, as Professor Tiedemann thinks, take place in 1799, when the pleura and peritoneum were inflamed. It was congenital, and had existed from the day of the man's birth; or at all events, it had been formed immediately after birth. And as in all these cases it gave an unwonted degree of severity and intensity to the symptoms of supervening diseases. This only we observe at present. We shall, in all probability, recur to the subject afterwards in its proper place.

10. *Closure of the abdominal part of the aorta above the bifurcation into the iliac arteries.*

In the body of a female, 70 years of age, of small stature, emaciated person, and with œdema of the lower extremities, Professor Tiedemann found the end of the trunk of the abdominal aorta above its division into the common iliac arteries very firm and completely closed. The length of the closed portion amounted to two inches. Immediately above the closure the trunk of the aorta was something corded, and so also at the origin of the two common iliac arteries. The solid mass which produced the closure was a dark-red incompressible leathery-like fibrinous clot, which was firmly attached to the inner coat of the artery, and extended into the beginning of the iliac arteries. The arterial walls showed concretions or ossifications; and the same were observed in the walls of the iliac arteries. The inner coat was in various points lacerated, and the scaly concretions projected into the canal of the artery. Bony patches were also found in the abdominal and thoracic arteries, and in the trunk of the femoral arteries.

The fibrinous clot was so firm that it could not be cut by the knife, and it consisted of solid layers placed on each other. It closed not only the aorta and the common iliac arteries, but the lower lumbar and the middle sacral arteries. The upper lumbar arteries were enlarged.

The circumference of the heart was considerable. The left ventricle was enlarged, and its walls were thickened. No lesion of the valves was found. No morbid changes in the other organs were observed.

This female had been admitted into a poor-house several years previously, on account of the debility of age. She had often complained of violent palpitation, constriction in the chest, and sleeplessness. Her latter years she had spent mostly in bed; and she died with symptoms of marasmus.

11. *Arctation of the orifice of the pulmonary artery from mutual adhesion of the semilunar valves.*

In the year 1835, during a residence at Liege, the author inspected, with Professor Fohmann, the heart of a young man of twenty-one years, who had died in the hospital, of disease of the heart, with symptoms of cyanosis. Till two years previously he had enjoyed good health; and excepting the usual infantile disorders, had never been seriously ill. He was then, after severe chilling, attacked by smart pleurisy, which was associated with violent action of the heart. At first the disease was little observed; but then was treated in the hospital with blood-letting and antiphlogistic measures. By these means the fever and a troublesome cough were abated; but there remained violent palpitation and difficult breathing, with an irritative cough, which was greatly aggravated by corporeal exertion. The skin of the countenance, of the neck, and the upper extremities were bluish; and the veins, especially of the throat, were much swelled. The motions of the right half of the heart were particularly violent, and strong beating was heard beneath the sternum. During the contraction of the ventricles a bellow's sound was heard very superficially on the left, below the sternum. The veins of the neck beat manifestly during contraction of the auricle. The pulse at the radial artery was quick, very small and feeble, and often intermitted during corporeal exertion.

Low diet, cathartic remedies, and small blood-lettings, observed during a long time, produced some alleviation. The malady meanwhile increased; the palpitations were more violent; the symptoms of breathlessness returned more frequently and lasted longer; the colour of the face became more blue; and general dropsy ensued. The powers of the patient sunk gradually; and he died.

On inspecting the body, serous fluid was found in the cellular membrane, and within all the serous membranes. The right costal pleura adhered in several points to the pulmonic pleura. The circumference of the heart, especially the right half, was large. The right auricle was greatly dilated and filled with black blood. Its walls were very thick; and the muscular *fasciculi*, especially the *musculi pectinati*, were greatly developed. The right ventricle was enlarged and hypertrophied. Its walls were greatly thicker than those of the left. The semilunar valves of the pulmonary artery were so united with each other and confounded into one single mass, that they had entirely lost their figure. Between them only was found a small roundish opening with a diameter of scarcely three lines.

On this case the author observes, that, in this abnormal formation and concretion or symphysis of the semilunar valves of the pulmonary artery, which had taken place during the time that the patient laboured under the pleuritic attack, must be sought the cause of all the morbid phenomena which succeeded the pleuritic attack. From this proceeded the great interruption to the motion of blood through the lungs, the accumulation of blood in the veins, the blue colour of the skin, and the venous pulsation in the neck. As the blood could not properly be impelled into the arteries, it accumulated in the right side of the heart, and during the contraction of the auricle, it regurgitated into the *vena cava*, and thus caused pulsation in the jugular veins. The right ventricle was, by the accumulated blood, irritated to excessively frequent and violent contractions, causing strong pulsation beneath the sternum. Another consequence of the blood in the right side of the heart and its greater exertions was the enlargement of its chambers, with hypertrophy of its walls. The bellows murmur on the left side below the sternum proceeded from the forcible transit of blood through the extremely contracted orifice of the pulmonary artery. The small feeble pulse at the wrist must have arisen from the small quantity of blood which could pass through the lungs to the left side of the heart.

This case must be arranged with those instances of more or less arctation of the orifice of the pulmonary artery, which we find to give rise to symptoms of *Cyanosis*, and which are at the same time united with more or less, sometimes a considerable degree, of communication between the right and left sides of the heart. These cases were considered in a memoir in the sixtieth volume of this Journal (1843), on occasion of an instance of similar contraction to that now described; and their proper and correct pathological theory was then explained.* It is only remarkable that, in the case given by the present author, no communication either between the right and left auricle or between the right and left ventricle was observed, or is mentioned.

With regard to the origin and date of the contracted and mutually adherent condition of the valves, we daresay that the conjecture of the author may be correct. It must, nevertheless, be observed, that to determine this point is not quite so easy as may at first sight be imagined. Many of these cases appear to be congenital; perhaps all of them are so; for we have yet to learn how much or how little mischief and misconstruction of the heart and the larger vessels the frame may endure. At all events, and under all circumstances, the cases tend to illustrate greatly the theory of *Cyanosis*, explained in the essay now mentioned, and to show, that this symptom depends not so much on communication between the right and left sides of the heart, as obstruction to the current of blood through the pulmonary artery, and consequent deficient aeration of the blood.

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* Notice of a Case of Cyanosis or the Blue Disease, connected with mutual adhesion of the semilunar valves of the pulmonary artery. By David Craigie, M. D., &c. Ed. Med. and Surg. Journal, Vol. lx. p. 265.

This concludes the first section of the first division of the work. In several respects the arrangement is not good, in so far as among this series of cases met with by the author, there are several, especially the ninth and the eleventh, which might, according to our notions on the subject, have been more properly placed in some other division of the work.

We have now to proceed to the second section of the first part, in which are given the instances of contraction of arteries, or obliteration of their canals, which have fallen under the observation of other physicians. Of these we must be satisfied with a much more abridged account, since many of them have been already published either in this or other journals, or are recorded in works already before the profession. We shall, therefore, partly make a selection of several of them, and we shall partly confine our notice to simple references.

The whole section is subdivided into fourteen chapters, each devoted to the elucidation of different forms of arctation, or obliteration in the vessels of the arterial system.

I. The first chapter is devoted to cases of narrowing of the orifice of the aorta.

Among all the forms of arctation, that of the orifice of the aorta is by far the most frequent. It is usually produced by some disease in the semilunar valves, but it may also be caused by a morbid state of the walls of the aorta itself. The lesions in the valves consist in, 1*st*, mutual concretion, 2*d*, growths or vegetations on them, and, 3*d*, in thickening and induration. These lesions may occur united with each other, or with similar conditions of the mitral valves, more rarely of the tricuspid valve.

Of these lesions, the least common, the author thinks, is that of arctation of the aortic orifice, from concretion or mutual adhesion of the semilunar valves. Of this he gives an example from Bouillaud, the eighty-first case of his second volume, in which the valves were confounded as it were together, being united at their margins, so as to form a fibro-cartilaginous septum, in the centre of which was a narrow fissure which scarcely admitted the tip of the little finger.

As to its comparative rarity we will not venture to give an opinion. But in our own experience it is not very rare.

The author refers also to two other cases in the museum of the College of Surgeons in Dublin, and one in that of the College of Surgeons at Edinburgh. These concretions of the aortic semilunar valves he regards as undoubtedly the effect of adhesive inflammation.

To this he adds adhesion of the semilunar valves to the inner wall of the aorta, as was observed in a case recorded by Littre, and another mentioned by Kingston.

Adhesion of the semilunar valves of this sort causes, he observes, no arctation of the aortic orifice, but rather the opposite, viz. permanent enlargement, and thereby it disturbs the circulation, since the blood of the aorta regurgitates into the left ventricle, to close which the valves are inadequate. The symptoms arising from this lesion have been considered by Kingston, Corrigan, Guyot, Charcelay, MacAdam, Wilson, and others.

A more common lesion is arctation of the aortic orifice from growths or vegetation on the valves. Of these growths, the size, shape, colour, and firmness are variable. Sometimes they resemble millet seed or hemp seed; sometimes lentiles, peas, beans; and in rare cases he has seen them as large as a hazelnut. Sometimes only a few are found dispersed over one or all the valves; sometimes, on the other hand, they are numerous, lie over each other, and present a berry-like aspect, resembling strawberries, mulberries, grapes, or the tops of cauliflower. In rare cases they are lobulated, fringed, and hang several lines long into the aorta. Their colour is gray or yellowish-white, or bright or dark red. When of recent origin, they are soft and easily lacerable. When they are of longer duration, they are hard, sometimes cartilaginous, or even penetrated with calcareous matter.

Of this sort of lesion he adds two examples, one from Fenema, the other from Bouillaud.

In the case given by Fenema, which was published in a dissertation at Leyden in 1821, the subject was a soldier, aged 43, of a Swiss regiment in the service of the Netherlands, who had been ill with asthma, and who, after labouring under symptoms of great oppression in the chest, irregular pulse, abdominal pulsation and dropsy of the abdomen, and œdema of the feet, died.

Besides serum in the chest and abdomen the heart was enlarged, and its trunks were larger than usual. The aorta was enlarged from its origin, and the arch was dilated aneurismally. The first intercostal arteries were narrowed and contracted, and then unusually dilated. The *innominata* was dilated and gibbous The left carotid and subclavian appeared enlarged.

The right auricle and ventricle were enlarged. The left ventricle was enormously enlarged; its walls were thickened; and the muscular bundles on the internal surface were strongly developed. The muscles attached to the mitral valves were threefold larger than usual. The semilunar valves of the aorta were most degenerated. All were large and broad, and occupied with lobulated growths and appendages. From the middle valve, which is opposite to the orifice of the left coronary artery, projected a membranous lobulated appendage, one inch long and three-fourths of an inch broad, terminated by a long small fringe. The other edge of this valve was thickened and gibbous. From the uneven surface of the second valve depended a long fringe-like appendage. The third valve, lying over the surface of the right coronary artery, was thickened, and its edge beset with fringed lamellæ. All these growths and appendages hung free into the aorta and contracted its orifice. The inner surface of the aorta, and all its branches as far as the aneurismal dilatation extended, was irregular, and occupied by the steatomatous degeneration. The walls were thickened to more than double.

The next case is the 58th of Bouillaud; and in which the semilunar valves were thickened, shrivelled, hard, encrusted with fibrous plates, and occupied by warty condylomatous-like growths, which were very numerous on the free side of the valve. Of these growths, which resembled the pseudo-membranous granulations of serous membranes affected with chronic inflammation, some consisted of half transparent jelly-like substance, others of whitish friable matter, which between the fingers crumbled into pieces of caseous consistence. The orifice of the aorta was thus much contracted.

Similar instances of disease in the aortic valves the author saw in the collection of the College of Surgeons, Dublin, and that at Edinburgh, and in the museums at Guy's Hospital, St Thomas' Hospital, and St Bartholomew's Hospital in London.

No morbid changes of the heart are more frequent than the thickening and induration of the semilunar valves, known under the common name of ossification, and which is caused by their penetration by, or conversion into, a solid white gristly-like matter, or by earthy, hard calcareous concretions. It presents different degrees. Sometimes they are caused by the *corpuscula Arantii* in the middle of the valves being occupied by fibro-cartilaginous matter, and which are then swelled to the size of lentiles, peas, beans, or even that of a hazelnut. Bertin saw in one aortic valve alone a concretion as large as a pigeon's-egg. Sometimes the fixed edge of the valve is thickened and of bony hardness. And lastly, one, two, or three valves may be completely hardened, like calcareous matter, rough, gibbous, or covered with small points. The aortic orifice is thereby uniformly rendered narrow. When the induration or ossification is partial, and the free edge not rigid, the valves may still preserve their proper position, may open and shut without causing much impediment to the motion of the blood through the aortic orifice. But when all the valves are penetrated with earthy matter, they become stiff and inflexible, and the orifice of the aorta is converted into a narrow, linear, or angular cleft, through which the blood, with difficulty and scantily, finds its way out of the ventricle.

With the semilunar valves of the aorta the mitral valve may be indurated, and left auriculo-ventricular aperture may be more or less contracted. Sometimes the tricuspid valve is thickened and the right auriculo-ventricular opening is contracted. Hearts with this morbid state the author saw in the anatomical collection of the College of Surgeons in Dublin.

Of this sort of lesion the author adduces five examples; one from Ruysch, one from Hodgson, (15th,) two from Dr Hope's work, (2d and 17th,) and two from Bouillaud, (62 and 71.)

The last form in this chapter is that of arctation of the orifice of the aorta from deposition of whitish, hard, gristly-like substance, or from earthy concretions in the walls of the aorta at its origin.

Of this two instances are given; one from Kreysig, (9th case,) and one from Dr Hope, (13th case.)

II. The second chapter is devoted to the consideration of narrowing and closure of the coronary arteries of the heart. It has been long observed that these vessels were liable to disease in their coats, and more or less arctation in their canals; and they have been known to be completely closed. This may be the result either of the deposition of coagulable lymph in consequence of inflammation, or the formation of earthy concretions in their walls. This is shown among others by the case communicated under 8 in the anthor's own series. There is, besides, a rare species of closure of the orifice of a coronary artery, which happens in consequence of accretion of a semilunar valve with the wall of the aorta. These statements are confirmed by various cases.

Arctation and closure from deposit of coagulable lymph or ossification of the arterial tissues is the most common form of the lesion; and of all the vessels in the body next to the aorta, it is most frequent in the coronary arteries of the heart. This is shown by cases recorded by Drelincourt, Bellini, Thebesius, Crell, Haller, Bianchi, and others. These have, nevertheless, been of little value to pathology, in consequence of their histories being sparingly or not at all given. A few casual remarks, indeed, are given by Crell, Senac, and Morgagni. But Jenner first suggested that some morbid change or ossification in the coronary arteries might be the cause of the serious and alarming symptoms called *angina* *pectoris.* Though this idea has not been altogether confirmed by subsequent observation, and though the symptoms of *angina* have been known often to proceed from other lesions, and sometimes to take place without any appreciable lesion in the heart, its arteries, or its valves, yet the remark of Jenner has been the means, in the hands of Parry and Black, of collecting several accurately observed and recorded cases.

The author gives two cases from Parry, (1st and 2d,) one from Black, one from Hodgson, and one from Kreysig, in the last of which the heart was atrophied,—a result which we have seen in connection with disease of the coronary arteries. Of closure of the orifice of the left coronary artery from adhesion of a semilunar valve to the inner surface of the aorta, he gives one instance from Dr Kingston, as published in the Medical Gazette, (1840.)

III. Arctation of the aorta comes next in chapter third. To illustrate the nature of this lesion the author adduces the following cases :—

1. The case of Stentzel, given already in this Journal in the Memoir of Dr Craigie, Edin. Med. and Surgical Journal, Vol. lvi. p. 431.

2, 3. Two cases by Morgagni, Epist. xxiii. Art. 4, and Epist. xlv. Art. 23.

4. One case by Petro Paolo dell'Arme ; also given by Morgagni, Epist. xxiii. Art. 39, 40.

5, 6, 7. Three cases by the elder Meckel, shortly noticed in the Memoir of Dr Craigie, Edin. Med. and Surg. Journal, Vol. lvi. p. 432 and 453.

8. One case by Baron Stoerck, Annus Medicus secundus, 1762.

9. The case of M. Paris, published in the Journal de Chirurgie par Desault ; and again in the Memoir of Dr Craigie, No. 1, Edin. Med. and Surg. Journal, Vol. lvi. p. 432.

10. The case by Sir Astley Cooper, published in Surgical Essays. Part I. p. 115. Lond. 1818 ; and in the Memoir of Dr Craigie, No. 3, Edin. Med. and Surgical Journal, Vol. lvi. p. 435.

11. The case by Ad. W. Otto, in his Neue Seltene Beobachtungen, Berlin, 1824. Dritter Abschnitt, c. xxix. ; and in the Memoir of Dr Craigie, Edin. Med. and Surg. Journal, Vol. lvi. p. 435, No. 4.

12. The case of Samuel Burki, published by Albert Meckel of Bern, in Meckel's Archiv, 1827, seite 345 ; and in the Memoir of Dr Craigie, No. 5, Edin. Med. and Surg. Journal, Vol. lvi. p. 437.

13. The case published by M. A. Reynaud in the Journal Hebdomadaire, 1828, Vol. i. p. 161 ; and in the Memoir of Dr Craigie, No. 6, Edin. Med. and Surg. Journal, Vol. lvi. p. 439.

14. One case from Andral, Clinique Medicale, Tome i. p. 66.

15. One case from Dr Hope, No. 26.

16. The case by Mr R. Law Nixon, in the fifth volume of the Dublin Journal, and in the Memoir of Dr Craigie, No. 9.*

17. The case by M. Le Grand, published at Paris, 1832; and in the Memoir of Dr Craigie, No. 7, Edin. Med. and Surg. Journal, Vol. lvi. p. 442.

18. A case by Schlesinger, from Casper's Wochenschrift, Berlin, 1835, No. 31, seite 489.

19. And one case from Dr Hargrave and the Dublin Museum.

Besides these there are given in an appendix two cases, which, as we understand, belong to this head. These are,

One case of contraction of the origin of the aorta from Morgagni, Epist. xviii. Art. 6.

One case of contraction of the aorta by Mr William Murie from Guy's Hospital Reports, October 1832.

Of the arrangement here observed we regret that we cannot approve. The learned author has placed together cases which, as we think, ought to have been distinguished and separated from each other. It appears to us quite clearly established, that whatever may be the determining or immediate cause of the closure or obliteration of the aorta in many of these cases, its occurrence at a definite point, the attachment of the *ductus arteriosus*, shows that it took place at a very early period of life, most probably immediately after birth, and did not occur at the period at which, as we understand Professor Tiedemann, he infers it took place. On this subject, however, we do not now wish to dwell; but must refer to the Memoir of Dr Craigie for the proofs and arguments which may be considered adequate either to elucidate or to establish the conclusion.

It is no doubt true that of the cases here introduced, in the most there was still a very small aperture of communication between the upper and lower part of the aorta, and the artery was rather contracted than obliterated. This we admit. But it must be observed that the difference is one in degree only, not in kind; and when it allows these cases to be arranged with others in which the determining cause of the obstruction was different, we must doubt the propriety and the justice of the method of classification.

IV. From contraction in different degrees, then, and especially that extreme arctation which takes place at the insertion of the *ductus arteriosus*, the transition to occlusion or obliteration is natural and easy. This accordingly occupies the next chapter, in which the author considers occlusion of the thoracic part of the aorta.

Of this form of lesion he gives three examples.

1. The first is the case published by the late Dr Graham in the fifth volume of the Medico-Chirurgical Transactions, and in the Me-

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* In the work of Professor Tiedemann, p. 65, it is said Vol. vi. of the Dublin Journal. But the correct reference is Vol. v.

moir of Dr Craigie, No. 2, Edinburgh Medical and Surgical Journal, vol. lvi. p. 434.

2. The second is the case published by Mr Jordan in the North of England Medical and Surgical Journal, August 1830, and in the memoir of Dr Craigie, No. 8, Edinburgh Medical and Surgical Journal, vol. lvi. p. 445.

3. The third is a case by Eichler, communicated by J. Romer, published in the Medizinischen Jahrbuchern des Osterreichischen Staats, 1839, B. xxix. H. 2, S. 200.

4. And to these we suppose we must add as a fourth, referable to the same head, one given in the appendix, viz. the case of obliteration of the aorta, observed and described by Dr Craigie, No. 1, in his memoir, Edinburgh Medical and Surgical Journal, vol. lvi. p. 427.

The third case, therefore, is the only new one. It took place in an officer of the Austrian army, who is represented to have been a man of agreeable exterior, of great vivacity, wit, and talent. He had been in all the campaigns from 1790 to 1815; and he had enjoyed life in its fullest measure. In his 45th year he was attacked with breathlessness and pains in the stomach, which are said to have been of a spasmodic character. For a long time he requested no medical assistance. But when the breathlessness became urgent, threatening suffocation, and when after every meal he was attacked with vomiting, he thought of obtaining professional assistance. Homœopathy was in the ascendant, and he applied to a homœopath, who prescribed, the account says, manifold remedies. The difficult breathing and the cramp-pains in the stomach persisted, and to these symptoms were added swelling of the lower extremities, and violent palpitation of the heart, which it is said deprived him of all rest. With homœopathy he was disgusted; and he sought the aid of an allopath, who allowed him to take for a long time magistery of bismuth and *digitalis*. The vomiting progressively ceased, and the breathlessness disappeared. There only now remained a peculiar disorder in the pulse, which continued to his death. He had indeed recovered from his most urgent symptoms, and life was protracted several years. Latterly he was tormented with hoarseness and dry cough. One evening he was playing at cards; and there he gave his humour, as usual, full scope; in the middle of his discourse he fell from his seat lifeless. This took place in his 50th year, so that he had lived five years after the appearance of the symptoms.

The heart appeared very much enlarged, and its walls were increased to three times their proper thickness. The valves were normal. The arch of the aorta was very much enlarged to the origin of the *innominata*. This and the left subclavian artery were enlarged. Both coronary arteries were ossified for the space of three inches. The arch of the aorta was at once contracted at the insertion of the *ductus arteriosus*, and then the artery was completely obstructed for the space of half an inch. The diameter of the thoracic and abdominal aorta was scarcely more than in a child of from 10 to 12 years. The coats of the arch of the aorta and those of the vessels issuing from it were thickened. The upper intercostal arteries proceeding from the aorta below the closed portion were greatly enlarged, their diameter being one-fourth of an inch. They communicated freely in the intervals between the third and fourth ribs with the branches of the internal thoracics, likewise enlarged. By this anastomosis was blood conveyed to the aorta below the place of occlusion; and the circulation of the blood in the lower half of the body was maintained.

The pulmonary artery, both trunks and branches, were enlarged. The lungs were sound.

The stomach was larger than proper; and the colon was dilated. The liver was enlarged, but not morbidly indurated. The gall-bladder contained twenty eight gall-stones, varying in size from a lentile to a bean. The spleen was much enlarged and indurated.

This case we should have had no hesitation in classing with that series in which the obstruction or occlusion takes place at the definite spot; and we should also have looked on the lesion as taking place at the fœtal or infantile period. We find, however. that Romer, the author by whom it is communicated, expresses the opinion, that such an obliteration cannot be regarded as an original malformation, but must have originated in a progressive morbid change in the coats of the vessel; and this opinion Professor Tiedemann thinks is well-founded.

It may be regarded as presumptuous in us to controvert the opinions of these two authorities. But we acknowledge, that the more we see and learn of these cases, and especially considering the exact spot at which they take place, we find it the more difficult to adopt any other conclusion, than that they take place at a very early period of existence, probably during the latter stage of the fœtal period, or at least soon after birth. As to the term original malformation, (Bildungsfehler,) that is merely a mode of speech rendered necessary by our limited and imperfect mode of conception. Malformations are supposed to exist from the first development of the frame, from the time when it is in the form of ovum. But when it is remembered that many, if not the whole of these malformations are really the structure and arrangement peculiar to the early period of fœtal existence, and are simply forms of structure peculiar to that period, protracted to the period of extra-uterine life,—or are forms of fœtal structure arrested by disease, and thus made permanent and stationary while the rest of the frame is undergoing the transformations that belong to the adult state,—we perceive that it is much more natural and less violent to believe, that this obstruction and obliteration of the aorta, as it may be, is dependent on fœtal structure, and is merely an extreme degree of the same process which closes the *ductus arteriosus.*

V. Next follows occlusion of the abdominal part of the aorta in chapter fifth; and of this the author gives eight examples.

1. The first is that by the Roman surgeon Nicolaus Larcheus, recorded in the writings of M. A. Severinus; and published in the Memoir of Dr Craigie, Edin. Med. and Surg. Journal, vol. lvi. p. 452. No. 1 of the Second Series.

2. The second is that of Fantoni, also published in the Memoir of Dr Craigie, No. 2 of the Second Series.

3. The third is that of Dr Goodison, published in the second volume of the Dublin Hospital Reports, also given in the same Memoir by Dr Craigie, No. 4 of Second Series.

4. The fourth is one from Nicod, Archives Generales de Medecine, Tome vii. p. 466.

5. The fifth is from Velpeau, given in the Memoir of Dr Craigie, Edin. Med. and Surg. Journal, vol. lvi. p. 456.

6. The sixth is that published by Dr Monro in the Edinburgh Journal of Medical Science, vol. iii. p. 74, and given in the Memoir of Dr Craigie, p. 455. No. 4 of Second Series.

7. The seventh case is from Maisonneuve, (These soutenue. Paris, 1835.)

8. The eighth is from Barth, Archives Generales de Medecine, 1835 Mai.

To be critical or fastidious on the labours of the learned author, which deserve the thanks of the profession, we are averse. But we still feel here, that in arrangement there is considerable error and some want of correct distinction. Here, for instance, we find a series of cases of obliteration mostly from aneurismal deposits and coagula. But again we meet with the case of Velpeau, which is one caused by the external compression of an heterologous growth, an encephaloid or carcinomatous tumour. Then we find the case of Maisonneuve, in an aged female of 74, who had incipient symptoms of gangrene of the feet, and in whom the aorta was found lined with scales and patches of bone. All agree in the fact of obliteration, but not in the mode in which that state is effected.

VI. We come next on a field somewhat different. We are no longer called to behold obstructions, arctations, and obliteration of the large main artery, and to contemplate the almost marvellous resources which the arterial system itself possesses and can put in use, in order to counteract the detrimental and pernicious effects of obstructions in a vessel so important. We are now introduced to arctations, obstructions, and obliterations in the second and third orders of arteries, obstructions sufficiently remarkable in several respects, but still taking place in an order of vessels less essential to the welfare of the system, and in which the collateral circulation, being more multiform and more extensive, the evils caused by the impediment may be more easily and efficiently counteracted.

The first is occlusion of the common trunk of the right carotid and subclavian artery,—the *innominata.* Of this the author furnishes three examples.

The first is from Mr W. Darrach, published in the Philadelphia Journal of the Medical Sciences. This was a common case of obliteration from deposits of lymph and fibrin in aneurism of the arch of the aorta. The second from M. Martin Solon, (Archives Generales, Tome x. Mars 1836,) was likewise from aneurism of the arch of the aorta, which had compressed and obstructed the superior *cava* and the *innominata* at the same time. And the third is a case which occurred in the practice of Sir R. Carmichael of Dublin, in the museum of the College of Surgeons, in which the preparation is preserved, and which was also caused by a very large aneurism of the aorta. It is described in the catalogue, Vol. ii. p. 133, and described B. c. 236.

VII. Of occlusion of the carotid arteries, the subject of the seventh chapter, the author gives seven examples, from Haller, Petit, Baillie, Pelletan, Astley Cooper, Lardner, and Otto. All are ordinary cases of occlusion from the pressure of aneurismal clots and plugs; and as they all are already published in works of easy access, on them it is unnecessary to dwell.

VIII. Of arctation and obliteration of the subclavian artery, which is considered in the eighth chapter, three instances, from Beauchene, Corvisart, and Hodgson, are given.

IX. Of occlusion of the axillary artery, three instances are given from Pelletan and Taunton, and the collection of the College of Surgeons of Edinburgh.

X. Of occlusion of the brachial artery and the vessels of the fore-arm, three cases are adduced foom Ribes, Rostan, and Abercrombie, and Thomson.

XI. In the eleventh chapter, the subjects of arctation and occlusion of the cœliac artery, the superior mesenteric and renal arteries are illustrated by the detail of cases from Hodgson, Chaussier, Fleischmann, Otto, and Respinger.

XII. Arctation, obstruction, and occlusion of the common iliac arteries and their branches, which next claim attention, is a result not at all uncommon; and many examples are scattered through the works of authors. The author gives cases from Fantoni, Clarke, Sir Benjamin Brodie, Legroux, Cruveilhier, Andral, Greene, and Ribes; the Guy's Hospital museum; the museum of the College of Surgeons of Dublin; and that of the College of Surgeons of Edinburgh.

Most of them are instances of occlusion, from the pressure of aneurismal deposits and clots. But two or three, for instance that of Sir Benjamin Brodie, that from Mr Greene of Dublin, one from Ribes, and one from Cruveilhier, are instances of closure of the artery from adhesion, and probably inflammation, with gangrene of the foot or toes.

XIII. The subject of the thirteenth chapter is interesting and important, namely, the simultaneous occlusion of several arteries in different parts of the body. This the author regards as decidedly the consequence of an inflammatory process extensively diffused through the arterial system. Of the occurrence he adduces two instances;—the first, the well-known case described by Dr Thomson in Mr Hodgson's work, and Mr J. W. Turner in the third volume of the Medico-Chirurgical Transactions of this city; the second from Meli, and by him published in the Journal of Omodei; and a brief notice of a third from Cruveilhier.

The first our readers may study in the volumes in which it is recorded. We shall merely recall to remembrance the essential characters of the morbid parts.

The brachial artery was at the elbow imbedded in a hardened mass, composed of the surrounding cellular tissue, veins, and nerves, all adhering firmly to each other and to the artery. The artery was impervious before dividing into radial and ulnar branches. Its calibre was also contracted, and its channel was filled by a cylindrical clot of firm lymph, which extended about one-quarter of an inch upwards from the point of division and adhered firmly to the inner surface of the artery. The orifice of a large branch was situate immediately above the termination of this clot of lymph.

The radial artery was obliterated for nearly one inch and a quarter. Its canal was much contracted and filled with lymph adhering firmly to its internal surface, and terminating in small conical processes about two lines long, which projected downwards into the tube of the artery. The obliteration extended only to the commencement of the ulnar artery. The coats of the arteries in the obliterated space were hard, thickened, of a whiter colour than natural, and adhered inseparably to the surrounding parts.

In the leg the muscles were dark in colour, very flaccid and lacerable; and in the course of the incision copious clots of blood were brought into view. Considerable hardness and adhesion were observed where the femoral artery perforates the tendon of the *triceps;* and in the upper part of the ham. In the course of the artery, immediately after perforating the tendon, was found an ovoid sac, which contained a hard solid substance, resembling lymph, of the size and shape of a nutmeg, amd with its surface covered with thick grayish-coloured fluid like purulent matter. This coagulum adhered firmly only to the upper extremity of the sac. Immediately above the sac, the tube of the artery was obliterated to the extent of half an inch. Its coats were much thickened; and its parietes were in contact and mutually adherent. From the obliterated portion a large conical coagulum extended up the vessel for three inches. For more than one inch and a half below the sac, the coats of the artery were thickened, and its canal was filled with a firm coarse line of lymph adhering strongly to the external surface, and sending a conical process half an inch long downwards. The sac consisted of several layers, the inner apparently composed of the dilated external coats of the artery, and the other layers of the surrounding cellular substance.

Beyond the obliteration, the popliteal artery was pervious and empty for the space of about two inches. Its coats appeared sound, except that there was opposite the origin of a large branch a small conical rent or fissure of the internal coats. Below this point the artery was again obliterated to the extent of one inch and a half by lymph effused within its cavity, and adhering, though not firmly, to its walls. The closed portion terminated in a thin sac of the capacity of a small bean, containing purulent-like matter, and similar to that found in the sac of the femoral artery. This sac was lacerable and its internal surface ragged and whitish. To the middle of its parietes was attached the origin of the anterior tibial artery, the coats of which were so much thickened that its canal was nearly obliterated.

Below the sac, the posterior tibial artery was filled for nearly two inches with lymph adhering to the vessel, and terminating in a conical clot where the peroneal artery is given off. The peroneal artery was for a short space natural; but its coats became suddenly hard and thickened, and its canal almost closed. Beyond this point its internal surface was of a dark-purple colour; and the coats of the vessel had lost their elasticity.

The femoral vein adhered to the femoral artery, opposite to the dilated part of the latter. The coats of the vein were here thickened, and its diameter diminished. Below this its cavity was in several parts filled with clots of blood. The aorta and femoral artery above the closure were healthy.

The necroscopic appearances indicate here, the author argues, inflammation and occlusion of several large arteries. On the latter fact there can be no difference of opinion; on the former, viz. its cause, there may. If we compare, he says, the phenomena recorded in the history of the case, we must regard them as a clear delineation of arterial inflammation, and must be convinced, how all these phenomena necessarily proceeded from the inflamed condition of the vessels and from the consequent occlusion. "The physicians did not," he continues, "understand the nature and essence of the disease—a circumstance which we mention, not as any reproach to them, since inflammation of the arteries and its diagnosis was still less clear at that period than it is at present. But it is surprising that they sought no explanation of the morbid phenomena from physiological arguments, which here might have suggested some leading point. Hence, therefore, the method of treatment pursued entirely failed; and had inflammation of the arteries been only remotely conjectured, they would certainly have prescribed, not port wine, opium, and bark, but repeated blood-lettings, and they would have enforced an energetic antiphlogistic course. I hope that my highly honoured friend Dr Thomson will receive favourably this candidly expressed opinion of a physiologist, to whom he has ever been much endeared by his great love of truth."

On the views here expressed we feel it difficult to offer any very decided opinion. It may be that he is right; it may be that his conclusions rest on too slender a foundation. There are, nevertheless, one or two points which every cautious reasoner would wish to take into consideration.

We have already said that there can be no doubt about the fact of occlusion of the vessels; (humeral, and femoral, and popliteal); but considerable doubt may be entertained as to inflammation being the cause; and though it were allowed to be the cause, was it an inflammation which could be checked and subdued by blood-letting?

We think also that every well-informed and cautious physician would pause a little before he allowed, that the mere history of the symptoms was so clear a delineation of the phenomena of general *arteritis*, as the learned Professor of Heidelberg represents it to be. First, (1st January) were febrile or general inflammatory symptoms coming and going for nearly one month. They then disappeared, probably under the influence of the treatment. Then comes all of a sudden, being two months after the first appearance of symptoms, stoppage in the circulation of the right arm; (5th March); then four days after, 9th March, the circulation is suddenly stopped in the right leg. In the course of two or three days the usual symptomatic effects of this stoppage appear in the right foot and toes, continue and increase; and death ensues on the morning of the 27th March, nearly three months after the first attack, and twenty-two days after the first indications of stoppage of the circulation.

It appears that when the stoppage of the circulation in the arm took place, Dr Thomson inferred that the obstruction was produced in the same manner as hæmorrhage is sometimes prevented in arteries which have been torn across, and an obstruction of arteries had been occasioned in cases of gun-shot wounds, where the ball had passed close to the trunk of an artery without dividing it; namely, by lacerating the internal coats of the vessels and causing their edges and flaps to project into the tube, by which obstruction to the motion of the blood is immediately produced, the blood coagulates, and the vessel is afterwards obliterated by adhesive inflammation induced at the spot of laceration.

The only question, indeed, is, what caused the laceration? Was it inflammation or a previous diseased state of the arterial tunics? On this point Mr Turner in his account of this case observes, that the constitutional symptoms which preceded the attack in several cases appear to have had an inflammatory character; and supposing that they may depend on a certain state of inflammation in the inner coat of the arteries, which by some pathologists has been regarded as a peculiar cause of fever, and that this could be ascertained by the symptoms; the antiphlogistic plan of treatment appears to present the greatest prospect of interrupting the progress of the disease. He adds, that in two of the cases, that now related being one, this method was actively employed from the commencement of the illness, yet without having the effect of preventing obliteration of the arteries.

The truth seems to be that no method of treatment could have very much influenced the result. The arteries were in a state of previous disease,—indurated, and probably atheromatous, certainly brittle and fragile, from previous chronic inflammation. Then came the acute attack; and under that, which still farther destroyed their natural elasticity, extensibility, and contractility, they gave way; and this accident was unavoidably followed by the attack of obliterating inflammation.

Professor Tiedemann, we think, overlooks this fact, that the inflammatory attack which caused obliteration was itself the effect of the laceration; and that consequently, though it might have been moderated by blood-letting and the antiphlogistic treatment, it is not very reasonable to expect that it could have been entirely subdued.

Of the case by Meli we give an abstract.

A mariner, 24 years of age, tall, of strong constitution and sanguine temperament, had spent three days in a very cold snowstorm in a vessel on the Ticino, mostly engaged at the pump. He was violently chilled, and was thereafter attacked with intense fever, attended with much heat, thirst, great headach, sense of constriction in the throat, and great anxiety. The skin was the seat of a sense of burning, which passed into itching. On the 17th January, the third day of his disease, he applied to Meli, who found the face flushed, the eyes suffused, and the pulse hard and tense; and the patient complaining of pain in the throat, difficulty in swallowing, and rheumatic pains, which were felt sometimes in the chest, sometimes in the abdomen. The patient lost some blood, and laxatives and antimonials were prescribed.

Though on the 18th January the patient was better, yet, on the 19th, all the febrile symptoms were more intense. The skin was in several places red, and in others presented effusions of blood as after beating. The pulse was very rapid, vibrating, and in the left arm dicrotous. The patient complained of great thirst, anxiety, throbbing headach, and strong pulsation over the whole body. The skin was painful, especially in the region of the larger venous trunks; and the slightest touch and pressure aggravated the pain. The blood drawn the previous day was covered with a thick buffy coat; the serum was very scanty, and the clot was firm and tough. As Meli considered the disease to be inflammation of the vessels, from the quick and violent beating of the arteries, and the redness and tenderness in the course of the veins, he ordered another blood-letting and the use of foxglove.

Next day, the 20th, the patient was rather better, but the night had been very restless. The symptoms also continued; and on the 21st, the extravasations on the skin were more numerous and larger; pure blood was discharged from the throat; and blood and bloody mucus from the bowels. It is, however, unnecessary to pursue the minute details. The symptoms persevered, notwithstanding the use of blood-letting, general and local, and foxglove with laxatives, till the 29th of January.

In the night between the 29th and 30th, the patient had a violent fit of shivering, he became very restless and anxious, and was convinced of the near approach of death. Meli, who was sent for, found him with shrunk features and dark-blue complexion; the pulse tremulous, intermitting, and scarcely perceptible; the abdomen tense and burning, and the extremities cold. With violent and agonizing oppression, the patient soon after expired.

The body was inspected anatomically with the greatest care on the 31st of January and the 1st of February.

The body was emphysematous; and in different parts of the cellular membrane reddish serum was effused, and there were ecchymoses. The nostrils and the rectum contained much blood. All the superficial and deep-seated veins of the lower extremities were filled with blood; and their walls were hard, thickened, and red-coloured internally. The arteries were in the same state. The trunk of the femoral vein and artery was highly inflamed, thickened, and solid; and their coats were covered with thick fine net-work of capillaries filled with blood. Their inner coat was lined with a layer of adherent plastic lymph, which in different points presented consistent purulent matter.

The abdominal cavity was filled with much reddish serum containing bloody clots. The peritonæum was much reddened and covered with numerous fine red vessels. In several parts of the intestines and mesentery there were ecchymosed spots. All the vessels of the abdomen, veins as well as arteries, were reddened and felt hard, as if they had been injected with the usual injection-matter, and externally and internally was found plastic lymph effused. In several places they were closed and united by the effusion of lymph; and in few places did they contain blood. In the anterior wall of the aorta, two inches above its division into the iliac arteries, there was found an opening smaller than a lentile; but no laceration was seen in the trunk. The arterial walls were swelled and much thickened, the calibre of the vessel was diminished, and the inner coat was of a brown red colour. At the point where the cœliac artery arises from the aorta there was a circular cording of the vessel, which extended to the division of that vessel into the gastric, hepatic, and splenic arteries. This consisted of effused plastic lymph, which resembled a false membrane, and could be detached by the handle of the scalpel.

The inferior *vena cava* was in like manner inflamed, much contracted in its calibre; and to its inner coat were attached patches of false membrane, which were like valves. The part of the *vena cava* ascending behind the liver contained purulent matter. The arteries and veins of the mesentery were inflamed, red and hard, and the vessels of the intestinal mucous membrane were much filled with blood. A similar condition of the blood-vessels of the stomach, the liver, the spleen, the pancreas, the kidneys, the urinary bladder, and the sexual organs was observed. Their inner membrane was covered with thick fine net-works of capillary vessels.

The arteries and veins of the upper extremities were greatly inflamed, and quite in the same state as those of the lower.

The pulmonary arteries and veins were also inflamed, especially the trunks, though less than the arteries and veins of the abdomen. The intercostal, bronchial, and œsophageal arteries, the walls were firmer and thicker than usual, and the inner membrane was inflamed. The heart had partaken in the general morbid changes of the vascular system. Its chambers were enlarged and its walls were hardened and firm. The trunks of the coronary arteries and their small ramifications, as also the coronary veins, were inflamed, and externally covered with lymph, which had exuded from the cellular membrane. The walls of the auricles and ventricles, as also the trunks of the arteries and veins, were covered with numerous capillary vessels. The inner surface of the left ventricle was lined with a coat of lymph, which stretched over the *columnae carneae* and partly hung free into the cavity of the ventricle; and the layer extended into the left auricle and into the beginning of the aorta. The inner surface of the superior *cava* was lined with coagulable lymph.

The inner surface of the throat was reddened, the *velum* was swelled, the *uvula* enlarged, and the whole were covered with numerous capillary vessels. Some clots of blood adhered to the mucous membrane.

The vessels of the brain and its membranes also presented marks of inflammation.

XIV. In the fourteenth and last chapter of this section the author treats of contraction and closure of the orifice of the pulmonary artery and diminution of its calibre.

The author justly observes that contraction of the orifice of the pulmonary artery, as well as complete closure, is most commonly a congenital imperfection or lesion. In short, it has been most commonly observed where there is either an opening in the *septum* between the right and left chambers, or where the aorta arises from both ventricles at the same time. It is unnecessary in this place to enter into details as to this point, which has repeatedly occupied attention in this Journal; and especially since the relation of arctation and contraction of the orifice of the pulmonary artery to *cyanosis* was made the subject of the memoir in this Journal already referred to.* It is sufficient to say that the subject is illustrated by the details of twelve cases.

The subject is distinguished into four heads; 1*st*, mutual adhesion of the semilunar valves; 2*d*, growths or wartlike excrescences on the semilunar valves; 3*d*, thickening of the semilunar valves, and deposition of earthy concretions in them; and 4*th*, arctation of the pulmonary artery without disease in the semilunar valves.

The first division is illustrated by one case from Morgagni, (Epist. xvii. Art. 12); one from Tacconi, already published in the Memoir of Dr Craigie in this Journal; one from Tommasini, (*Clinica Medica di Bologna*); one from Bertin, (*Traité des Maladies du Cœur et des gros vaisseaux*, *Paris*, 1824); one from the essay of Louis, (Paris, 1826, see this Journal, Vol. xxviii. p. 126, 127); one from Chelius, (in den Heidelberger Klinischen Annalen 1827, Band. iii. S. 417); one from Burnet, (Journal Hebdomadaire, 1831); one from Cruveilhier, given in the Memoir of Dr Craigie, (Anatomie Patholog. livrais. 28); one from Philouze, (Bulletin de la Societé Anatomique, Bibliotheque Medicale 1826); one from the collection of the College of Surgeons in Edinburgh, (No. 1070, 1071); and one from Urban, (Jahrbuchern des Artztlichen Vereins zu Munchen 1841. Jahrgang 3, S. 147).

The fourth form is illustrated by one case from Kreysig, (B. iii. S. 119, Ein und zwanzigster Fall).

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* Notice of a Case of Cyanosis connected with mutual adhesion of the semilunar valves of the Pulmonary Artery. By David Craigie, M. D. Edinburgh Medical and Surgical Journal, vol. lx. p. 265.

This completes the first part of the work of Professor Tiedemann. From the view now given of the facts collected, our readers will be perfectly able to understand the nature of the materials, which the author has employed in the composition of his work. No one can deny the labour, the learning, and the accuracy which the author has employed; and while he has selected from every authentic source all the most pointed and valuable instances of the lesion, of which he treats, he has presented to the profession the means of estimating the correctness of those conclusions and general inferences, which he afterwards deduces.

To the second part of the work, therefore, entitled Conclusions and Observations, we now proceed. This the author divides into two sections; the first treating of the morbid states which induce arctation and closure of the arteries; in other words, the various causes of arctation and closure, and their influence and mode of operation; and the second devoted to the history of the consequences and effects of arctation and closure of the arteries, or the symptomatic effects thence resulting.

From the great number of cases recorded, Professor Tiedemann thinks it clearly results that arctation and closure of arteries is not so rare an occurrence as physicians have hitherto imagined. There is scarcely an artery of the human body which has not been found narrowed, closed, and impervious to the blood.

The morbid conditions which may lead to and terminate in this lesion, he thinks, may be referred to the following four heads: *1st*, to inflammation of the inner smooth coat of arteries; *2d*, to growths and morbid excrescences of the inner coat; *3d*, to deposits of solid or earthy concretions or purulent matter between the coats; and *4th*, to clots of blood, which like plugs close the tubes of arteries.

In inflammation of the internal coat, lymph is deposited in the canal; and the fibrous coat is contracted as when it is enclosed in a ligature. The area of the arteries is thereby narrowed or completely closed. Inflammation of this kind may be occasioned either by external causes, wounds, or the application of a ligature, or peculiar mechanical actions, as the pressure of aneurismal swellings, hypertrophied organs, or other swellings lying in the neighbourhood of arteries. Or inflammation may be caused by morbid internal irritations of different kinds.

The growths which narrow or close the channels of arteries are morbid products, and growths or productions from the inner coat in consequence of inflammation.

The deposits between the arterial tunics, which narrow the area of vessels or close it entirely, are of different sorts. They consist of solid whitish or yellowish substance, of the firmness of cartilage; or they are earthy concretions or calcareous matters, resembling plates and scales, known under the name of ossification; or they resemble true purulent matter or the puriform substance which goes under the name of *atheroma.* The plug-like clots of blood which contract and close the canals of arteries take place either in aneurismal swellings, and are productions of the fibro-albuminous layers of the aneurismal sacs, which have been formed in the arteries; or they are found in arteries, in the walls of which have been deposited earthy concretions, which have perforated the inner coat, project into the canal, and by their sharp points and edges have caught the fibrinous parts of the blood, and deposited it in layers.

These morbid states may exist singly or conjointly; and often all of these, especially in the aorta, are observed to concur.

The author, after this general glance, proceeds to consider successively the peculiar nature and the operation of each of the causes now specified in a series of nine chapters.

The first of these is inflammation of arteries (*arteritis*) and wounds and mechanical actions, and arctation or closure thereby induced.

This is so obvious a mode of inducing adhesion and obliteration, that it requires little more than mere mention. In the case of wounds, however, it may be observed that most commonly pressure is afterwards conjoined; and where this is not the case, the wound, though followed by a certain degree of inflammation, fails to induce adhesive inflammation; and most usually an aneurismal tumour is the result. This is almost invariably the case with vessels of any size. With lacerated and contused wounds it is different. These almost uniformly produce so much laceration of the internal and middle coat that the ends are retracted, the motion of the blood is arrested, coagulation takes place, and obliteration follows. It is hence that the ligature is so effectual in causing obliteration; because it at once wounds and places the parts of the deligated vessel in the position of the lacerated wound, and it also unites compression, or at least mutual application. This leads the author to take a full view of the effects of the ligature, both on the artery to which it is applied and on the collateral series of vessels, and their enlargement. But as the observations on this head, though correct and instructive, are not new, we need not dwell on them.

A blow or contusion on a limb may in like manner be followed by inflammation of the artery, agglutination of its coats, and consequent obliteration.

Inflammation from internal causes is a more difficult and less known subject. Without denying either the occurrence or its effects, we apprehend, nevertheless, that the author is much too easy in the evidence which he thinks adequate to establish the fact. For instance, when he states that a more or less brilliant redness of the inner coat of arteries has been recognised by all the observers specified by him, we must doubt the sufficiency of the mere character of redness to establish the fact of arterial inflammation. Nothing is more common than to observe a certain amount of redness in the interior of the large arteries in the dead body; and it has been observed so frequently and in such opposite circumstances, that most correct observers have arrived at the conclusion that it is a pseudo-morbid appearance; and can never alone be admitted as an anatomical character of inflammation. Of this the author is indeed aware, and allows that redness alone is a criterion not adequate to establish the fact of *arteritis*. It is only, he adds, when the inner coat is not only reddened, but thickened, softened, and rough, and covered with coagulable lymph, that the vessel so affected can be allowed to be inflamed. Red coloration, he adds, swelling, thickening, opacity, and detachment of the inner arterial coat, with effusion of coagulable lymph within the arterial canal, take place uniformly in *arteritis* from internal causes, exactly as they do from the application of a ligature, pressure, or from wounds. The thickened and opaque inner coat may then easily be scraped off in large shreds by the scalpel or the nail, and there is attached to it more or less abundantly and firmly, a foul or reddish lymph.

Even in many of the cases of inflamed artery, there is observed externally effusion of lymph to a greater or less extent. This merely shows that the inflammatory process had affected the external as well as the internal part of the vessels.

The same phenomena, he remarks, are observed in inflammation of the pulmonary artery; and this he illustrates by quoting from the Esperance, (1835, Mars 5,) the case of a laundress, in whose body after death clots of blood were found to extend from the right ventricle into the pulmonary artery and its branches, adhering to their walls, while the inner membrane was rough, flocculent, and presented in various points small whitish specks, to which the coagulated blood adhered. In various spots also could be detached membranous shreds, which resembled coagulable lymph.

An important feature of *arteritis* from internal causes, next noticed by Professor Tiedemann, is, that, with the adhesive inflammation, there are invariably, as in the case of a ligature previously applied, external pressure or traumatic inflammation, more or less contraction of its canal, and an evident constriction of its walls. Never is the tube of an inflamed artery so filled with effused lymph that it preserves its circumference and diameter, and also presents a firm cylinder filled with lymph and thereby obstructed. Always there is met at the inflamed spot of the artery, and as far as the inflammation extends, a progressive diminution in its diameter, even to the abolition of its area, though the walls present no deposit of earthy matter. Then ensues in general the complete adhesion of the arterial walls and the closure of the channel; and the artery is converted into a ligamentous chord precisely as if a ligature had been applied. He might have added, that this contraction appears externally in the shape of an indentation more or less deep.

The author is at some pains to prove that this diminution in diameter and contraction and closure of the canal of any artery, from adhesive inflammation, is not in any way produced by the elasticity of the walls of the artery; because they are still exposed to the impulse of the blood from the heart. This we willingly admit; and we think it does not require any proof.

The external contraction above noticed is particularly remarkable in the trunk of the aorta, and especially in that class of cases in which the constriction takes place at what has been termed by Dr Craigie the definite spot; namely, the insertion of the *ductus arteriosus*. This contraction and closure, he thinks, has erroneously been regarded by Otto, Andral, and Barth, as a congenital and original malformation, and not a morbid condition first induced subsequent to birth. Certainly, he is obliged to allow there are cases in which the aorta, and still more frequently the pulmonary artery, in new-born children is unusually narrow or even obliterated. Thus Corvisart observed an extreme congenital contraction of the aorta. E. L. R. Romberg found in the body of an exposed child, who had breathed with difficulty, who was blue in the face, and died the fourth day after birth, the cavities of the right side of the heart enlarged; their walls thickened; the left auricle and ventricle very small, and no trace of aortic orifice; the *foramen ovale* wide open, and its valve directed to the right auricle; the pulmonary artery giving branches to the lungs, and then sending the *ductus arteriosus* to the aorta. From the arch arose the carotid and subclavian arteries. There was therefore a congenital closure of the origin of the aorta, and below the same the aorta must have received blood from the pulmonary artery. Louis, Burnet, and Ecker in like manner met with cases of congenital smallness of the aortic orifice. As to congenital contraction of the pulmonary artery, that has been seen in several cases by J. Hunter, Tacconi, Farre, Meckel, Caillot, Legallois, Jacobson, and others; and complete closure by Hodgson, Nevin, Fleischmann, Ring, Howship, and other observers.

The author is, by these cases, compelled to take a middle course, and to say that such congenital contractions and obliterations of the large vessels of the heart may very probably arise from inflammation; since it is well established that inflammation may attack the organs of the fœtus. Cruveilhier also regards this contraction of the pulmonary artery, especially a congenital one, not as a primitive formation, but a morbid condition, which may arise in consequence of inflammatory irritation.

Of this modified opinion and its merits we shall speak anon.

Professor Tiedemann then lays down the proposition, that the cause of the arctation and closure of the aorta with evident chording, as if a ligature had been applied, must, in all the instances adduced in the present work, be sought, not in a congenital malformation, but as first taking place after birth, in the effects of previous inflammation. In favour of this, he observes that most of the patients had in early life enjoyed good health, and had throughout presented no symptoms of disturbance in the circulation, which must have been the case had the arctation and closure taken place at birth. In addition to the testimony of Dr Graham, who, as to his patient, considered the contraction as the effect of inflammation of the artery, as well as Romer, he mentions that Meckel and Hermann add the remark, that the obliteration of the aorta could not, in their cases, be regarded as an original malformation, if the cause is to be sought in a disease of the tunics.

In short, Professor Tiedemann concludes that arctation and closure of the origin and thoracic part of the aorta must be regarded as a consequence of adhesive inflammation in all those cases already mentioned, in which the contraction or obliteration takes place at the definite point, and in the abdominal aorta, in the cases of Nicod, Velpeau, Maisonneuve, and Barth.

With these conclusions, as to the exclusive influence of inflammation, we cannot agree. Without denying the existence of inflammation and adhesive inflammation as taking part in the process of arctation and closure, we think that something else is also present; and we do not think that it is in any way proved by the cases adduced, that the contraction or obliteration did not exist long before the occurrence of those symptoms, which were conceived to denote its presence, and which took place soon before the death of the patient. As to the question of these cases of aortic arctation and obliteration being congenital malformations, we think it is a mere verbal dispute, which scarcely deserves any attention; and it has been to us matter of surprise that the well-informed and intelligent professor of Heidelberg has thought it necessary to bestow on it so much attention.

The main argument adduced by Professor Tiedemann to prove that the arctation and obliteration are of recent occurrence, and took place in this class of cases long after birth, and probably only a short time before the fatal event, is derived from the consideration, that the individuals who were subjects of this lesion presented no symptom of disordered, impeded, interrupted, or disturbed circulation, and had, for a considerable time, sometimes the course of a long life, enjoyed good health and strength, and performed many laborious duties, until the occurrence of those symptoms which took place not long before death, or which terminated in the fatal event.

Now it must first be asked, how do we know that the circulation was impeded or interrupted even by this lesion? Are we so well acquainted with the functions of the blood-vessels as to maintain positively that this lesion, great and striking as it undoubtedly is, is sufficient to interrupt the motion of the blood to the abdominal viscera and lower extremities? Is there no other channel by which blood may be conveyed sufficient to answer the ordinary exigencies of the system, when the thoracic aorta is thus narrowed and obliterated. These questions can best be answered by referring to the state of the circulation in the case of M. Paris; in that of Samuel Bürki given by Albert Meckel; in that given by M. Renaud; in that by Mr Joseph Jordan; and in the 9th case by the present author. From these cases it appears, that the intercostal arteries were very much enlarged, and very tortuous and serpentine; that the transverse cervical arteries, the thoracic, the epigastric arteries, and the circumflex iliac arteries were all unusually large, and were all employed in conveying, by free communications, blood to the abdominal viscera and to the lower extremities; and that, consequently, the motion of the blood to the lower part of the trunk and extremities was neither disturbed nor interrupted.

The enlargement and tortuous disposition of these arteries could not have taken place within a short time or recently. We know that arteries of the collateral series, when a main trunk is obstructed, take a considerable time to enlarge sufficiently to perform the vicarious part of conveying to the proper regions the blood which was previously conveyed by the main trunk; and sometimes they do not enlarge sufficiently in proper time to perform this function at all. We must infer, therefore, that these arteries had been enlarged at a very early period in the existence of the individuals; and that they continued increasing in size and capacity according to the growth and exigencies of the system.

There appears, therefore, to be nothing physiologically inconsistent, or absurd, or impossible in believing this lesion to have existed a very long time; and if it be admitted to have existed for ten years, it may quite as well be allowed to have existed for the whole of the ordinary duration of human life. It is further to be observed that the lesion has been found in persons of all ages; that is, the individuals who have died with it have been cut off at very different periods of life. The subject of M. Paris died at 50; the case of Mr Winstone at 57; the case by M. Le Grand at 48½; Dr B. at 27; the subject of the case of M. A. Meckel at 37; the 9th case by Professor Tiedemann at 69; the case by Eichler and Romer at 50; the case of Dr Graham at 14; the case of Dr Otto at 17; the case by Reynaud at 92; and the case by Dr Craigie at 7 years. This last case alone is sufficient to show that the lesion does take place at an early period of life; and the apparent perfect nutrition of this and all the other subjects of the lesion, must be held as quite sufficient to prove that a proper quantity of blood was conveyed by other channels to the lower portion of the body; and that the presence of the lesion is not incompatible either with the continuance of life, or the maintenance of health and corporeal vigour.

The more, indeed, we consider the history and anatomical peculiarities of this class of cases, and especially the uniform evidence of the two additional cases in the present volume, the more are we convinced that the lesion had existed from a very early period, probably from the period of birth, or either a little before that event or immediately after. In every one of the twelve cases the arctation or obliteration took place at the same exact spot, namely, at or a little below the insertion of the *ductus arteriosus*. In every one of the twelve cases the contraction or indentation was greatest at the convex side of the artery, which appeared, therefore, to be drawn to the fixed point of the aortic trunk, namely, the insertion of the *ductus arteriosus*. In every one of the twelve cases the appearances of the contracted spot were such as indicated not a recent arctation, but one of long standing.

How could all this uniformity take place, unless it was under the influence of some general principle. It appears therefore impossible to resist the conclusion, that the obliteration in all these cases was determined by one and the same cause; and we must suppose this cause to be the extension or prolongation of the same action which obliterates the *ductus arteriosus*.

As to the question of original malformation or an accidental cause like inflammation being the exciting cause of this obliterating action, it is, as we have already said, a mere verbal dispute; and this, we think, will clearly appear to be the case by reflecting on the anatomical facts and physiological history of these parts in which this lesion takes place. What, then, are these anatomical facts, and what is this physiological history?

In the first place, it is to be remembered that the pulmonary artery, which is in the fœtus larger than the aorta, divides at once not into two, but into three branches: two of these going to the right and left lung, and which convey as yet little blood, because the lung is not expanded by respiration, and little circulates through it;—and one going to the aorta, conveying into that vessel a large quantity of blood, in order to be sent by its abdominal portion into the abdominal organs and the lower extremities. Such is the state of matters previous to birth.

Secondly, the aorta being still very small, receives, before the entrance of the *ductus arteriosus*, a small quantity of blood from the left ventricle; and which is sent mostly by the *innominata* and left carotid and subclavian arteries to the head and superior extremities.

Thirdly, at birth a very great change takes place. The infant breathes; the lungs are expanded; the dingy blue colour of the face and surface gives place, in one moment almost, to the bright red hue indicative of what has taken place internally;—that blood exposed to the air has traversed the lungs and is circulating through the whole body. As the lungs are expanded, a copious current of blood rushes along the two pulmonary branches of the pulmonary artery; the current, hitherto ample, which had flowed through the *ductus arteriosus*, is gradually but rapidly diminished; until there is no longer blood to flow by that channel, the whole being required and actually carried, by the indrawing powers of the lungs, into these organs. The duct thus deprived of its current of blood contracts at the same rate at which its contents are diverted into another channel; adhesion of its sides or walls follows; and its channel is obliterated, while the textures, of which it consists, are converted into a ligamentous chord.

It is not ascertained at which end, the pulmonary or the aortic, this mutual adhesion begins. But it is most probable that it begins at the aortic end; because, though a small quantity of blood may still keep open the pulmonary, that quantity may be and must be insufficient to distend the aortic end, which consequently is contracted and closed first. It must be remembered, also, that the blood flows in this duct from the pulmonary artery to the aorta, and not from the aorta to the pulmonary artery, as some persons seem to think.

In the fourth place, let us attend to the state of the aorta in all these changes. That vessel is small, and the blood passing through it is derived, as already stated, from two sources. The blood which enters the orifice and flows by the ascending part of its arch, proceeds from the left ventricle. The blood which enters by the *ductus arteriosus* and pursues mostly the course of the abdominal aorta, is derived wholly from the pulmonary artery and the right ventricle. The moment, however, that this supply is cut off, either very little blood flows through the abdominal aorta for some time, or some time is occupied in allowing the blood proceeding from the left ventricle to find its way round the arch and down the descending portion of the aorta, and, in short, in adjusting the motion of the blood and its quantity to the new course which it pursues.

It is surely neither an unnatural nor a violent supposition to imagine, that if, at this time, by any of those multiplied causes which are incessantly operating on the textures of animal bodies, the closure or adhesive inflammation, which begins at the aortic end of the *ductus arteriosus*, be prolonged into the aorta, it is quite possible that a degree of the same action may be there commenced, and produce the arctation or obliteration which is observed in the cases which are now under consideration. It is difficult in any other mode to account for the indrawing, as it may be named, of the aortic trunk towards the duct; and when once this is admitted, the whole process appears to be clear, evident, and intelligible.

Then, let it also be remembered, that, if this agglutinating process is commenced while the aorta is not larger than a goose-quill, how easy it is for the chording arctation or even obliteration to take place. In fact, the aorta is seized by this accident while it is still small. The contraction and adhesion take place and prevent the artery from enlarging at that spot; while above and below, it partakes in the general growth of the system. There is therefore merely an arrest, as it were, of growth in this part of the aorta. Meanwhile the impediment to the motion of the blood here established causes it to seek other channels; and it takes, or rather preserves those already given it, namely, the intercostals, transverse cervicals, thoracics, and epigastrics; a matter so much the more easy, as all these vessels are soft, pliant, yielding, and easily distensible. These vessels meanwhile, thus early made the carriers of the blood to the lower extremities, partake in the general growth of the system and the general expansion of the vessels; and the whole function of the circulation, and the nutrition of the abdominal viscera, and the lower extremities is carried on by the new collateral system of vessels, amidst a great and remarkable obstruction of the main trunk, with as great perfection and facility, and with as complete external appearances of health and vigour, as if no similar impediment existed.

This appears to be the true explanation of this singular lesion, and of the more singular fact, that the system can endure it for a long series of years without injury, at least excluding severe acute disease of the lungs and heart, or some great strain on the organs of circulation.

As to the actual determining cause of these contractions and obliterations, or the circumstances which determine their occurrence, we are altogether in the dark; and it is better to confess ignorance than to assign insufficient explanations.

Dr Norman Chevers, in the Medical Gazette, has indeed brought forward the conjecture, that it may be the effect of the left recurrent nerve, which winds round the arch near the spot.* But this seems inadequate to account for the occurrence, if we remember that the recurrent nerve winds round the aorta in every case, whereas this accident occurs in a very small proportion of the human species; and if we further remember that the indentation of compression is deepest in the convex part of the aorta, whereas the recurrent nerve in its enclosure of the arch touches only the concave part of the artery.

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* Observations on the Permanence of the Ductus Arteriosus, and Constriction of the Thoracic Aorta, and on the means by which the duct becomes naturally closed. By Norman Chevers, M. D. London Medical Gazette, No. 913, vol. xxxvi. New series, No. 5, p. 187.

If these observations be well-founded, if these reasonings be justly made,—it results that, while these instances of arctation and obliteration of the aorta cannot, strictly speaking, be regarded as congenital malformations, yet they must be viewed as the effects of a natural action carried to an exaggerated extreme, and though not taking place in the fœtus, yet depending on its anatomical peculiarities, and occurring so speedily after birth as to depend on certain revolutions in these peculiarities.

One observation only of practical tendency we add. This greatest of all lesions in the arterial system, and the least compatible apparently with its functions, is counteracted, and its evils are obviated by another provision, which the arterial system itself possesses. By this provision, the collateral circulation performs its part so perfectly, that it seems as if intended to call attention to the multiplied resources which Divine wisdom employs in the construction of animal bodies, in order to counteract evils and compensate for their effects. The contrivance, employed as it is by nature, is perfect in ordinary circumstances. In the extreme morbid exigencies of the system alone it seems to fail,

Such is the result of the experiment when tried by nature. What is the result when tried by art? The surgeon, observing what has been done in this manner, has attempted to enclose the aortic trunk in a ligature, and, trusting to the collateral circulation, has interrupted the current of blood through the main trunk. The attempt, though successful in its performance, has failed in its effects. The collateral vessels have been unable, in circumstances of this kind, to continue the circulation.

Can we explain the reason of this failure? It is to be found, we believe, in the different, perhaps opposite, circumstances in which the two experiments were undertaken and completed. Nature commences her operation in infancy, probably immediately after birth, while the vessels are still soft, pliant, elastic, distensible, and easily acommodate themselves to the force of the circulation even when disturbed. The surgeon, on the other hand, is obliged to undertake his operation when the individual is far up in life; in frames undermined by intemperance and enfeebled by labour and debauchery; amidst the traces of incipient or confirmed disease; when the arteries have acquired a great degree of firmness, are not easily distensible, may be diseased and fragile, and would sooner burst or be lacerated than yield. Is it wonderful that the result is unsuccessful?

We must add, before quitting this subject, that we cannot see the propriety of referring to this head the case given by Velpeau, in which a heterologous growth outside the aorta had compressed its walls and caused obliteration. This compression may doubtless produce adhesive inflammation, as other compressing causes do; but there is a vast difference between the adhesive inflammation arising spontaneously, and that which results from the strong and daily-increasing compression of a heterologous tumour. Is it not, we ask, mere apposition; and, if the tumour were by any means removed, would not the channel of the artery be re-opened?

The presence of whitish or gray lymph within vessels in this state is scarcely to be regarded as a conclusive proof of the fact of adhesive inflammation; for that gray or whitish lymph may be the decolorized fibrin of the blood, exactly as we find it deposited in aneurismal tumours.

The arctation and closure of other arteries in other regions of the body, Professor Tiedemann represents with confidence, in by far the greatest number of cases, to be owing to adhesive inflammation in their walls. With the general correctness of this view we do not feel disposed or see much reason to differ. There may certainly be cases in which probably other causes than adhesive inflammation may operate. For instance, mere atheromatous deposit may in certain cases cause the union of the arterial walls and imperviousness of their canal. Still the occurrence, we have no doubt, is owing, as the author thinks, to adhesive inflammation in most of the instances.

The mutual adhesion or concretion of the semilunar valves, both of the aorta and of the pulmonary artery, the author in like manner ascribes to inflammatory action. Of this there seems little reason to doubt in all those cases in which the valves are found simply adhering with a central aperture on the middle.

This occurrence he represents to be much more frequent in the pulmonary artery (seite 147) than in the aorta.

Morgagni and Louis have expressed the opinion that this union or *symphysis* of these valves is a congenital malformation. And in favour of this opinion they have observed, that in several of the cases the *foramen ovale* was found open; as in the cases by Morgagni, Tacconi, Tommasini, Bertin, Louis, and Urban. In the case by Louis there was, at the same time, in the pulmonary artery a small opening which led into the left ventricle. In the cases by Chelius, Burnet, Cruveilhier, Philouze, and the author, on the other hand, the *foramen ovale* was closed. In opposition to this idea, that the lesion is a congenital malformation, Bouillaud, Burnet, and Cruveilhier regard the accretion of these valves as a consequence of adhesive inflammation. The author thinks properly that this opinion is favoured by such cases as that of the patient recorded by Chelius, who was a powerful well-grown man, who had long performed without inconvenience the laborious duties of a soldier, and which he could not have done, argues the professor, had he been affected with any original malformation of the pulmonary artery. The beginning of his disease commenced evidently at the time, when he felt violent pricking pain in the breast, which arose from inflammation of the right pleura, and which was found, on dissection, adhering to the lung. With these was probably, the professor thinks, at the same time associated inflammation of the pulmonary artery and semilunar valves. At all events from this time the patient presented all the symptoms of disturbed circulation, violent palpitation, and great difficulty in breathing.

All this is very probable; and perhaps in several of these cases of *symphysis* of the semilunar valves, the lesion may have taken place as a superinduced disease in the course of life. The question appears to us not in all cases very easily determined; and if it were, of no great importance.

A much more important one, it appears to us, is the consideration of the pathological influence and relations of the lesion, more especially as to the Blue disease (*cyanosis*.) That affection has been hitherto ascribed to the communication between the right and left sides of the heart solely; and probably it is in a certain class of cases connected with the existence of these preternatural openings. It must be observed, however, that in all the most exquisite examples of the disease, and above all, in all the congenital cases, the most essential and the primary lesion is more or less arctation, sometimes obliteration of the pulmonary artery; and the perviousness of the *foramen ovale*, or the *septum* of the ventricles, are mere effects of this primary lesion. The proofs of this it is unnecessary here to consider, as they were mentioned at sufficient length in the memoir of Dr Craigie, in the sixtieth volume of this Journal, (p. 265,) as already noticed. The two cases published in that essay for the first time, with others republished from Tacconi and Cruveilhier, present distinct examples of the extreme and exquisite form of this lesion, and are sufficient, it appears to us, to establish the accuracy of the proposition now stated, and farther to show, that the communication between the right and left chambers of the heart, instead of being a cause of the disease, is itself the effect of the cause, and the means employed by nature to counteract the injury which otherwise would follow, and to prolong the life of the patient.

If in all these cases the arctation or obliteration of the pulmonary artery by accretion of its valves was not, strictly speaking, congenital, or commencing in the fœtal state, at all events it must have been of very early origin, and certainly began a little before or at the period of birth.

With inflammation of the inner coats of the arteries it is rare to find suppuration associated. Barde observed a little puriform matter in his case; and in the case by Thomson and Turner, grayish semifluid matter like purulent was found in the cyst of the popliteal artery, and in the posterior tibial artery.

The author proceeds next to treat of the growths from the inner coat of arteries and from the semilunar valves, as products of inflammation, and as causes of arctation and closure of the channels.

The inner coat of arteries is occasionally occupied by small growths, of different size, shape, and consistence; they are most frequently observed in the semilunar valves; and in some instances, as in one of the cases recorded by Meckel, they are found at the same time on the semilunar valves and in the trunk of the aorta; and in this case there was also a whitish tough matter deposited between the inner and the fibrous coat. On the semilunar valves they may resemble small tubercular bodies, warts, or loose pendulous vegetations, similar to those on the heads of cauliflower. Bodies similar in appearance, the author observes, were seen in the trunk of the aorta by Morgagni, and more recently by Bright.

These growths are much less frequently seen in the semilunar valves of the pulmonary artery. Yet here also were they observed by Sandifort and by Corvisart.

The fourth case given by the author presents these growths on the free edges of the aortic semilunar valves. Similar swellings Lobstein observed on the inner surface of the auricle and ventricle and on the mitral valve. In one case the inner surface of the left auricle was occupied for a quadrangular space four lines in diameter by growths similar to ears of barley. Bouillaud saw on the tips of the mitral valve, which were thickened, hardened, and fibro-cartilaginous, roundish, friable, reddish, warty granulations, collected like cauliflower heads, of the size of a common pin. In another case, on the thickened tips of the same valve, he observed bright red granulations. In a third case, the tricuspid valve was occupied with horny cauliflower-like warts of the size of lentiles or hemp seed. In short, it appears that not only the valves, but the inner membrane of the auricle and ventricle, and especially the inner membrane of the aorta, may present growths or excrescences, various in shape, soft and firm, warty-like, tubercular, and irregular.

When these bodies were first observed by the early cultivators of morbid anatomy, they appear merely to have excited astonishment, without giving rise to any reflections or inquiries as to their source or original formation. This absence of all inquiry as to the most likely causes of the formation of these growths continued to a late period. Morbid anatomists were indeed more anxious to observe and record facts than to account for them. This self-denial was at once praiseworthy and philosophical. Baillie notices their existence, but with characteristic adherence to mere statements of fact, he refrains from any conjecture on their origin.

In the work of Scarpa on Aneurism we first recognise any attempt to ascend from the matter of fact to its cause. Almost all growths on the valves and most of those on the internal coats of arteries he ascribed to the influence of the syphilitic poison; and Corvisart, who saw in the appearance of these warty growths formed on the semilunar and mitral valves, a resemblance to the warts, *fici*, and *condylomata* taking place in the venereal disease, appears to have had no doubt of the syphilitic origin of the former. The idea is nothing but a coarse, rude analogy, which will not stand serious examination. Undoubtedly these bodies were, and are often observed in the cardiac valves and membranes of persons, who, like Corvisart's patient, are suffering, or who have previously suffered, under the symptoms of syphilis. But, then, it is forgotten that to these persons mercury had been liberally and repeatedly administered; that they had been leading lives in which debauchery, dissipation, excess, and irregularity of all kinds were familiar; and that growths and excrescences of the same kind, and affecting the same parts, were also seen in persons who had never been tainted with the syphilitic poison. In the last class of cases, we believe that the objection was attempted to be evaded by asserting, that the taint might have been, or really was hereditary; and that thus it might appear in the fœtus, as Sandifort and Meckel had observed. This argument might even be employed with advantage against those instances of the lesion which are recorded by Farre, Kreysig, Hodgson, and others, as having been found in the bodies of persons who had never suffered from the effects of the syphilitic poison; and the force of which the author himself is obliged to admit.

The truth is, that we think that the observations now collected may be justly admitted to show, that the inner coat of the arterial system, and probably the fibrous coat too, are liable to the formation of certain deposits, at a certain period of life in the majority of the human race, whatever be the mode of life pursued; and that though these deposits may take place at different periods of life in different individuals, yet in all they are liable to take place.

It may be regarded, further, as established by pretty extended observation, that the tendency to these morbid productions in the arterial system is very much under the influence of certain causes or agents, which may sometimes operate like remote causes, and in other instances like exciting causes. Thus, the excessive and habitual use of spirituous liquors is a cause of very considerable influence in developing this tendency and determining its formation and activity. The use of mercury also has a considerable effect in inducing various morbid changes in the arterial tunics. Rheumatism, also, by acting on the lining membrane of the heart, (*endocardium,*) and producing there local or general inflammatory action, sometimes in the mitral valves, sometimes in the auricular membrane, and sometimes in the aortic valves, must be regarded as a cause potential in this view of morbific agents. Lastly, gout, it cannot be denied, exerts often a morbid action on the arterial tissues, and on the cardiac membrane and valves.

These considerations and arguments, however, leave untouched the main point of the inquiry, which is, in what manner do these agents operate in producing these growths; is it by inflammation acute or chronic; and are these its products; or is it a sort of degeneration or perverted nutrition?

To elucidate, if not to answer these questions, the author adduces the following facts.

Hodgson considers the granular or spongy excrescences as formed during inflammation of the inner arterial and cardiac membrane from effused lymph; and to the same opinion Bertin and Bouillaud are inclined. Laennec admits that though a clot of blood, connected with the inner membrane, may have become organic, yet it may also be formed from effused lymph; and the same view is taken by Andral. To this he allows it may be objected, that albuminous exudations could scarcely adhere to and grow on the free surface and edges of the valves, amidst the strong current and friction of the blood on them, and on the inner surface of the walls of the heart, during alternate contraction and dilatation; and hence Kreysig and Hope regard these excrescences on this as morbid growths and disorganizations of the inner membrane itself. The author observes that certainly they resemble most the excrescences and growths which are formed in chronic inflammation of the inner surface of the serous membranes, the peritonæum, the pleura, and the pericardium; and he thereby seems to favour most the latter opinion.

At first these excrescences are always soft, compressible, and easily detached. Progressively they become firmer and acquire often a gristly hardness. Lastly, earthy matter is deposited in them, and they become as hard as bone, though they retain their original shape. These earthy concretions are mostly formed in the semilunar valves and in the aorta. Hence he thinks that the distinction attempted by Laennec between the globular and warty excrescences, and that by Bouillaud between the albuminous and fibrinous granulations and the bony or cartilaginous excrescences are equally unsatisfactory.

Lastly, from various facts given by Lancisi, Corvisart, Fenema, Bouillaud, he concludes that it is sufficiently proved, that the wart-like growths from the inner surface of the heart, on the valves and in the arteries, must be regarded as the result of previous inflammation of these parts.

In some respects this inference may be well founded; in others it is stated in terms too general and comprehensive. The truth appears to be, that, though several of these growths may be referred to attacks of inflammation affecting the inner membrane of the heart, in others they are known to take place without any marks or indication of that process, at least in the acute form. It may be admitted, nevertheless, that even in this class of cases, in which they arise and advance slowly and imperceptibly, they may be associated with some degree of chronic inflammation. In this respect, the question, which is one of some importance, however, resolves itself into a dispute concerning the meaning of words. If by inflammation be meant that process which always precedes and terminates in the formation of morbid growths of all kinds, then it is justly called inflammation. But if it be allowed that, to the formation of many of these growths and morbid products, derangement in nutrition is requisite, then probably these ought to be classed as effects of misnutrition, (*paratrophia.*)

The author proceeds next to consider the arctation and closure or occlusion of arteries, which is caused by aneurisms.

This result of the compression exerted by aneurismal tumours has been long known to pathological observers. It takes place in one of three modes; first, by the aneurismal sac exerting pressure on a neighbouring artery; secondly, by the fibrinous layers of the sac being continued into the artery and stopping the canal; and thirdly, by the aneurismal sac and the arteries proceeding from it, assuming the adhesive inflammation, and depositing lymph, by which their walls are agglutinated and their channels are closed.

These processes, he adds, take place only in those aneurisms which are named partial or limited, in which both the inner coats are lacerated, and blood is effused into the cellular tissue, which then forms the sac. The blood effused into the distended cellular membrane, being without the circulation, is coagulated, and its fibrinous matter forms the layers of clotted blood found in the sac. In the rare order of spherical or fusiform aneurisms, in morbid enlargement of the arteries with dilatation of all the coats without laceration, which are most frequent in the ascending part and arch of the aorta, and also in the descending aorta, in the division of the carotid and iliac arteries, and in other vessels observed by Senac, Morgagni, Lieutaud, Haller, Guattani, William Hunter, E. Sandifort, Scarpa, Pelletan, Blackall, Richerand, Hodgson, and Breschet, no closure of the arteries was observed. The blood remains in the enlarged parts of the arteries in motion, and coagulation either does not take place or there are scarcely traces of it. There is formed no firm solid swelling, which might exert pressure on the neighbouring arteries and induce agglutination of their coats; neither are there polypous concretions and fibrinous layers, which might close the arteries proceeding from the sac.

When sacs of partial aneurisms filled with solid fibrinous clots have such a position that they are inclined towards the arterial trunk, exert pressure on the same above or below the aneurismal sac, or on one of the neighbouring arteries, they cause closure of these vessels, as Scarpa and Hodgson have shown. The same result here follows as in the case of external pressure or the application of a ligature, namely, arctation and inflammation of the inner coat of the compressed artery, exudation of coagulable lymph within its canal, contraction of the fibrous coat, narrowing, and lastly agglutination. The closed arteries are usually converted into solid ligamentous chords.

Arteries, in which there are partial aneurisms, are sometimes plugged and closed by fibrinous clots continued from the aneurismal sac to their canal. This happens most frequently with small branches which arise near the site of the aneurismal tumour.

As examples of closure of arteries from clots of blood in aneurisms, he adduces the case of Fantoni in the abdominal aorta, (52,) the case of aneurism of the aorta at the origin of the cœliac artery, by Hodgson, (77,) in which the latter was closed; the case by Chaussier, in which the cœliac, superior mesenteric, and several of the intercostal arteries were at their origin closed by fibrinous clots; and the case by Fleischmann, (80) in which, from aneurism of the aorta at the fissure of the diaphragm, the orifices of the cœliac and superior mesenteric arteries were closed.

Aneurismal swellings and the arteries proceeding from them not unfrequently become inflamed; lymph is effused within them; and hence agglutination and closure follow. This he thinks was the state of matters in the case given by Haller, and in that by Monro the third. The occurrence of this event may in certain cases be so perfect as to close the artery going to the sac, and produce thereby the spontaneous cure of the aneurism without pressure or the application of the ligature. Thus Valsalva mentions a case of spontaneous cure of an aneurism of the popliteal artery by agglutination of the sac; and Ford appears to have seen an aneurism of the same vessel disappear under the long continued observance of rest and low diet.

Gangrene attacking an aneurismal swelling is another mode which nature occasionally employs in effecting the inflammation and closure of the vessel, and thereby the spontaneous cure of the tumour. The external integuments pass into suppuration, and the fibrinous layers are thrown off from the sac. By this, hemorrhage is in general prevented, so that the arteries above and below the swelling secrete coagulable lymph, by which their canal is closed and their walls are agglutinated. Recovery takes place, only when the patients have sufficient strength to withstand the symptomatic influence of the gangrene, and endure the process of ulceration, which are debilitating.

Lastly, the spontaneous cure of an aneurism may take place when the sac bursts and blood is extravasated beneath the skin. The effused blood then compresses the artery above and below the burst aneurism, excites inflammation, and obliterates the artery. This was probably the case, he thinks, in an instance recorded by Archer, after laceration of an aneurism of the left femoral artery, which the patient survived.

Here, however, we must at present make a pause. We have in the present account considered all the new matter adduced by the learned and laborious author, and the most important parts of the subject. Much yet remains to be done; but this we must defer till our next number. Meanwhile we trust that, from the specimen of the work now adduced, our readers will be able to form an idea of the great merits of this work on the pathological relations and physiological effects of obstructions in the arterial system. Our own opinion of the work may be understood from the length and amplitude, at which we have detailed the facts and canvassed the doctrinal principles of the author. This we have been solicitous to do with the utmost candour and justice. If we differ from the author, it is only because we find that we cannot, without resisting facts, agree with him. The work is the only one which presents an ample, extensive, and systematic view of the subject.

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## Art. II.—*Guy's Hospital Reports.* Edited by George H. Barlow, M. A. and M. D. Cantab. &c., Edward Cock, F. R. C. S. &c., Edmund Birkett, M. D. Cantab. &c., J. H. Browne, M. D. Lond., and A. Poland, Esq. New Series. No. IV. Oct. 1844; No. V. April 1845; and No. VI. Oct. 1845, with numerous Plates.

In our 160th number a short analysis was given of the cases and papers contained in the first three numbers of the new series of Guy's Hospital Reports. Three numbers of that interesting periodical have since been published, and the papers contained in them do not fall short in interest or importance with those which preceded them. Besides nine clinical reports full of instructive cases, the present numbers contain four papers which might be arranged under pathology, three under surgery, one under therapeutics, three under medical jurisprudence, and two under midwifery.

Perhaps the most important paper under the head of pathology is that entitled,

*On the Pathology of Phthisis* By T. Addison, M. D. Senior

Physician to the Hospital.—In Dr Addison's former paper the changes produced in the pulmonary tissue by the mere process of inflammation were carefully described, as, without this previous knowledge, he considered it a hopeless task to attempt any analysis of the pathological appearances met with in the lungs of persons dying of consumption. To these, therefore, or to the abstract of them given in our 62d volume, we must refer, in order that the facts and statements adduced in this paper be better understood. In it he demonstrated that pneumonia not unfrequently leaves behind it divers forms of induration of the pulmonary tissue, all of which have been somewhat indiscriminately but erroneously regarded as modifications of tubercle or of tubercular infiltration.

These deposits are often produced by that simple form of pneumonia which is quite overlooked, as it occasions little cough or expectoration, or is treated as a case of continued fever. This form of pneumonia is unquestionably most liable to occur in cachectic subjects, in whom its symptoms are still more liable to be masked. But whether these morbid changes occur in tuberculated lungs or in lungs unoccupied by tubercles, they have the same origin—are the result of pulmonic inflammation; they have the same tendency to go on to permanent induration or repair, or to go on to disorganization, softening, and abscess, giving rise to excavation and most of the ordinary signs and symptoms of phthisis. To such an extent is this the case, that Dr Addison states it as his conviction, from a lengthened examination of the subject, that he very much questions whether there ever was a single instance of tubercular disease of the lungs proving fatal, in which more or less of this pneumonic change might not have been distinctly recognized, had the prevailing notions respecting tubercular infiltration not obscured the perception of the beholder.

As to the question what amount or degree of hepatization or infiltration can be recovered from, Dr Addison believes that the red hepatization may be so completely removed by the powers of nature, as to leave the lung perfectly healthy. How far an albuminous deposit, fit to produce gray hepatization, may be removed is a question yet unsettled. It seems probable that where it has gone no further than just sufficient to impair the opacity, constituting the early grey hepatization, it may be removed so as to leave the lung healthy; and Dr Addison has witnessed cases of this kind. But when the albuminous deposit has gone so far as to produce induration, and consequently obliteration of the cellular structure of the lung, he regards the notion of the functions of that portion being restored as nothing better than a pathological absurdity. The bronchial tubes passing through or near these indurated portions are often considerably dilated, but this Dr Addison conceives to be the consequence and not the cause of the indurations. Three illustrative cases of this pathological change are narrated.

From the facts and principles which Dr Addison has advanced in this and in his former papers, he arranges the several forms of disorganization of the lungs, to which the term phthisis may be applied, under the heads of pneumonic phthisis, tuberculo-pneumonic phthisis, and tubercular phthisis.

*Pneumonic phthisis* results from inflammation alone, and may be acute, acuto-chronic, or chronic. In the acute form the deposits and inflamed tissues soften down and become disorganised at once, without any attempt being made at induration or repair. This form, therefore, constitutes what is termed acute or galloping consumption. In the acuto-chronic form, the inflammation is slower and more insidious in its course, and manifests some attempts at repair, as indicated by various stages and degrees of induration. The induration, however, is never complete, the pulmonary tissue continues friable, and in a few weeks or months softens down and gives rise to excavation. This either occurs by means of an ulcerative process, or by an actual slough of greater or less dimensions being formed. In another variety of this form of disorganization the inflammation supervenes upon or around ancient induration, and goes on to disorganization of the recently inflamed tissue, often accompanied by that of the old induration. In the chronic form two varieties may be observed; first, that in which old indurations undergo a slow process of disintegration, giving rise to vomicæ; and secondly, that very rare form of the disease in which an insidious inflammation proceeds very slowly to convert a considerable portion of pulmonary tissue into gray induration without any necessary excavation whatever.

*Tuberculo-pneumonic phthisis* is a very common form of com plaint, in which, although tubercles are present, the really efficient cause of the phthisical mischief is the pulmonic inflammation. In this form the existence of tubercles indicates the strumous diathesis, and manifestly predispose to the inflammatory change; but beyond this they do not appear to be either primarily or secondarily concerned in the serious changes observed to take place in the pulmonary tissue. The great transparency of simple pulmonary tubercle for some time after its development, and the total absence of any degree of surrounding opacity, are irreconcilable with the idea of actual inflammation being necessary for its production.

Simple pulmonary tubercle is most frequently of a gray colour, having a vitreous or semitransparent appearance, moderately hard, and apparently homogeneous. It varies in size from the merest point to that of a mustard seed, which it rarely exceeds. To this form of tubercle Dr Addison applies the term sthenic; they are comparatively little prone to disintegration, a tendency which is indicated by yellowish opacity and loss of cohesion. The asthenic form of simple tubercle is from the first, and however minute, of an opaque white colour, sometimes with a faint yellow tinge, softer and more friable than the above, and occasionally attaining a larger size. They are more prone to disintegration than the last. One or other of these forms is observed to predominate in different cases of phthisis; but in the tuberculo-pneumonic phthisis, the sthenic form is observed to preponderate. The sthenic tubercles may, by deterioration, assume the characters of the asthenic, but not the converse, as the uniform tendency of all tubercles is towards loss of cohesion and disintegration.

Pulmonary tubercle has its seat in the delicate filamentous tissue, which forms the slight filmy parietes of the air-cells, and bears to them the same relation that tubercle does to serous membrane. The increase of size and apparent growth of pulmonary tubercle beyond the size specified, depends on changes taking place in the adjacent cells, either from the development of additional tubercles, or from inflammation. The enlarged tubercles are therefore either the aggregation of simple tubercles, and may then be termed compound tubercles, or they are simple tubercles enclosed in the products of inflammation. These compound tubercles are more liable to disintegration than simple tubercles. When tubercles are numerous the neighbouring pulmonary cells become more or less enlarged, and pretty uniformly afford indications of compensatory or excessive function. This compensatory action increases the difficulty of recognising simple tubercles in the lungs, as it is rarely, if ever possible, to detect them either by dulness of sound on percussion, or by diminished respiratory murmur, unless they exist in great numbers, or in groups of considerable size. In general, the only indication at a very early period, in which any confidence can be placed, is a certain degree of inequality in the respiratory murmur, that being a little more loud or puerile at certain points, or in one lung more than in the other.

When tubercles are present, there exists a great proneness to increased vascular action in the lungs and their appendages. This tendency, however, is greatest in the immediate vicinity of the tubercles. Unless subjected to causes calculated to aggravate such tendency to congestion, an individual may experience little or no inconvenience from the presence of such tubercles. The inflammation which supervenes, is usually of a low insidious kind, and is rarely attended with sufficient serous exhalation to produce pneumonic crepitation; but the bronchi become dilated and their parietes thicker and softer than natural.

This inflammation in the pulmonary tissue or in the bronchial tubes is the ordinary commencement of tuberculo-pneumonic phthisis; and hence it happens that most of the symptoms and physical signs of phthisis may manifest themselves without evidence of any change in the tubercles themselves being discoverable after death. The physical signs which become apparent as the disease advances, viz. feebleness or absence of respiratory murmur, bronchophony, tubular respiration, and dulness on percussion, Dr Addison states to be more the results of inflammation than of the extension of tubercles, and may occur in pneumonic phthisis without tubercle being present. The permanence and degree of heat of skin always bear relation to the rapidity and extent of the local changes.

The red hepatization produced by inflammation in this variety of phthisis very often passes rapidly into softening and the consequent formation of a cavity. Sometimes, however, albuminous matter is thrown out, and becomes hardened and contracted to a certain extent. These results have been commonly but erroneously regarded as mere varieties of tubercular infiltration. The contraction of these deposits causes flattening of the ribs—an effect never produced by mere excavation. The attempts at repair, or induration, of the pneumonic deposit are rarely complete and are not durable, so that the deposits sooner or later soften and produce excavation. The natural cure of the ulcer thus produced consists in the formation of a more or less dense lining membrane which may remain passive and harmless for years; but if the ulcerative process proceeds, the adjoining structures are encroached on, and the patient dies from continued irritation and imperfect nutrition.

In those cases in which there is no attempt at repair in the pneumonic deposits, they, as well as the surrounding tissue, soften down at once, and give rise to one of the forms of galloping consumption. In those cases, however, where diffuse inflammation attacks lungs generally studded with tubercles, it gives rise to what Dr Addison terms suffocative pneumonia. This is characterized by extreme dyspnœa, lividity of lips and countenance, and commonly by the rapid dissolution of the patient. In this case the inflammation proves fatal before albuminous deposits occur; and crepitation is heard to the last.

In almost every variety the amount of expectoration depends on the extent to which the bronchial tubes happen to be implicated, but its appearance in general affords no positive test either of the existence or extent of the disorganization.

As much has been talked of late of the curability of consumption, Dr Addison states it as his opinion that, when pneumonic deposits have proceeded to that state which constitutes the uniform albuminous, iron-gray, or granular induration, though they may remain passive for years, it is impossible to imagine they can ever be removed, or the natural and healthy tissue of the lung be restored.

Possessing no means of removing tubercles when once developed, our resources are purely prophylactic, and all such as are calculated to improve and strengthen the general health, and remove all the predisposing and exciting causes of inflammation. When tuberculo-pneumonic phthisis has fairly commenced, the inflammatory symptoms must be subdued by appropriate depletive treatment, bland diet, warm clothing, regulated temperature, or removal to a milder climate. Mercury is a questionable remedy, as it often hastens the disorganization.

*Tubercular phthisis* is the third form which Dr Addison describes. He thinks it may be fairly doubted whether the term tubercular, taken in an exclusive sense, can with propriety be applied to any form of phthisis, for, at the present moment, we are not in possession of any conclusive evidence that either tubercle or its degeneration ever constitutes the primary and essential cause of the disorganization, which characterises fatal phthisis. Phthisical disorganization may be present with or without tubercle. In the tuberculo-pneumonic phthisis tubercles are present, but, being generally simple and of the sthenic kind, remain quiescent till inflammation be developed around them. In this form of phthisis the tubercles present the asthenic character, generally exist in great numbers, either continuing separate or becoming aggregated together so as to occupy several adjacent lobules, or even a considerable portion of an entire lobule of a lung. The simple tubercles of which the compound tubercles are composed are of an opaque, gray, or whitish colour, those which are largest presenting greater opacity and less cohesion than the rest: the centre also sometimes presents the appearance of softening. Black streaks, which many have regarded as consisting of black pulmonary matter, pervade these compound tubercles; but Dr Addison has satisfactorily ascertained that these streaks are nothing else than pneumonic veins filled with black blood, so that, for a time at least, the compound tubercle continues to receive blood-vessels. After a while actual softening takes place, sometimes at one point, sometimes at another, and occasionally at several points simultaneously. It is difficult to ascertain how this softening occurs. Dr Addison feels inclined to believe that it is one of the attributes of asthenic tubercle. But, though the primary softening of asthenic tubercle generally occurs without being preceded or accompanied by inflammation of the surrounding lung, there probably never was a fatal case of this form of phthisis in which the surrounding portions of lung were not more or less extensively inflamed. This inflammation, however, is not confined to the tissue of the lung in immediate contact with the tubercular masses, but often arises at a distance from the tubercles, apparently healthy pulmonary tissue intervening. It is, moreover, often accompanied by inflammation of the pleura immediately over it This inflammation observes the same asthenic character as the tubercles themselves, the feeble red or gray flabby hepatizations, or complete albumenization passing rapidly to disorganization, or the latter presenting the appearance of purulent matter. Occasionally the part at once becomes gangrenous. There is scarcely ever an attempt at cicatrization, the destructive actions going on uninterruptedly, till the patient sinks. Dr Addison, therefore, very justly regards this form of phthisis as incurable and hopeless, and ventures to add, that if a preventive or curative remedy be ever discovered for tuberculo-pneumonic or tubercular phthisis, it will be very different from the enervating remedies so indiscriminately employed at the present day.

The bronchial tubes very commonly present structural changes dependent on want of tone, being softened, thickened, and opaque, so as to be not unaptly compared to a pipe of boiled maccaroni. These, on a transverse section, are often mistaken for tubercles softened in their centres. The membranous portions of the same tubes, when passing through tubercular deposits, are often found dilated and filled with purulent matter, and are hence often mistaken for softened tubercles.

This important contribution to the pathology of the lungs, which goes to prove that inflammation constitutes the great instrument of destruction in every form of phthisis, is concluded with a list of fourteen diseases which, to Dr Addison's knowledge, have been mistaken for phthisis.

*Remarks on the Pathology of Iritis.* By J. F. France, Assistant-Surgeon to the Eye Infirmary.—Mr France's paper is almost exclusively confined to the subject of syphilitic iritis, in which he takes occasion to point out its diagnostic marks, and his reasons for considering it as quite distinct from the arthritic and simple forms of that complaint. The arthritic variety most usually occurs in elderly individuals; and when the other parts of the eye are implicated, it is the sclerotic, conjunctiva, and cornea which are affected. In syphilitic iritis, on the other hand, the disease is most common in the young or middle aged, and is more apt to be complicated with affection of the choroid membrane than to the other structures of the eye. Mr France states that he regards the dusky reddish-brown hue which the iris assumes in the syphilitic form of iritis as quite pathognomic of this form of the disease, and apparently closely allied to the coppery stains of the skin in the syphilitic eruption. Another diagnostic mark which is not always present, but, when it is, is quite conclusive as to the origin of the disease, is the occurrence of very minute dark-brown specks in the lower segment of the substance of the cornea, circular in form, and with well-defined margins.

The differences which arthritic and syphilitic inflammation cause in the appearance of the iris are next minutely pointed out. In the arthritic form, if the disease be not soon checked, the entire circle of the pupillary margin is soon fixed by lymph to the capsule of the lens, and even the whole area of the pupil may be overspread with white or yellowish-white lymph. The surface of the iris is not partially discoloured in rusty-looking spots, but assumes an uniform greenish or yellowish hue, and the tumefaction is not partial but general. In the immense majority of cases of arthritic iritis, the lining of the anterior chamber and serous covering of the iris are, in common with the sclerotic, the principal seat of the disease; and thus is shown the close connection between rheumatic affection of the structure of the eye and those of other parts in its preference to affect free serous surfaces, and produce effusion. Syphilitic iritis, on the other hand, chiefly affects the parenchymatous structure; hence the peculiar tumefaction resembling tuberculation, and the rusty colour which is assumed. The tubercles are generally regarded as attachments of lymph to the free surface of the iris, but Mr France points out that "the irregularities of the surface of the iris are due to its proper substance being, at certain points, swollen and infiltrated, because the surface, though irregular in level, is continuous, and the confines of the swellings are lost insensibly in the surrounding comparatively healthy part." As the disease advances, one or more of these tumefactions greatly increases in size, so as to constitute a tubercle projecting high above the general plane, or even overlapping its own base. In this case it does occasionally though rarely happen that a thin film of fibrin is effused over its surface, from sympathetic inflammation of the aqueous membrane.

Several interesting cases of syphilitic iritis are narrated, showing the mild and severe forms of ordinary character, those characterised by tubercle, and that arthritic variety of syphilitic origin which sometimes follows gonorrhœa.

The paper is concluded with remarks on the treatment found most efficacious in subduing syphilitic iritis in Guy's Hospital. General blood-letting is condemned, as producing or still further aggravating that irritable cachetic state to which syphilitic subjects are so prone. Cupping, coupled with a brisk purgative, forms in general the commencement in every case of a mercurial course sufficiently decided to affect the mouth. In many cases, sarsaparilla, with or without iodide of potassium, may be given along with the mercury, especially in cachectic subjects; or the mercury may be combined with hyoscyamus, chalk, conium, or other remedies, according to the necessity of the case. Blisters to the temples and inunction with blue ointment and opium subsequently to the cupping often prove most beneficial. Oil of turpentine can be rarely employed with advantage, as it is chiefly in those rare cases in which the aqueous membrane is chiefly affected that its use is indicated, and it is very apt to act prejudicially on the kidney. Extracts of belladonna or of conium round the eye are proper.

The arthritic iritis is treated by local depletion but to a much smaller extent; mercury as an alterative, along with saline purgatives and colchicum; the early use of tonics with alkalies, and the application of belladonna locally.

*Illustrations of some of the forms of sudden death from disease as it occurred to nineteen individuals in the Manchester Workhouse.* By D. G. T. Francis, M. B.—The nineteen cases narrated by the author for the most part proved fatal within a quarter of an hour, and are divisible into five heads according to the cause of the disease. 1. Three cases of death from palsy of the function of respiration from pressure upon the *medulla oblongata.* 2. Eight cases from accumulation and delay of blood in the right heart and lungs, from causes chiefly seated in these organs—asphyxia. 3. Five cases from inability of the left heart, &c. to propel the blood in sufficient quantity to the brain—syncope. 4. Two cases from apoplexy; and 5. One case, cause undiscovered.

1. In two of these cases blood was effused; in the first on the surface only, in the second also into the ventricles and central parts of the brain. In the one case the arteries were highly diseased, bony and atheromatous deposits affecting the coats, and in this case the heart was healthy. In the other case the arteries were healthy, but the heart was hypertrophied. The brain in both cases was natural in consistence and seemed healthy, but the kidneys were diseased. In the third case there was no effusion of blood on or within the brain; the vessels were simply prodigiously distended with blood, constituting that rare form of apoplexy denominated *coup de sang.* The heart was in this case small, weak, and flabby; but the stomach was distended with food, and the intestines with flatus. This man died within five minutes after seizure, within a very short time after taking a full meal.

In remarking on these cases, which are detailed at length, Mr Francis remarks, that the most remarkable symptom which characterized them in common was the decided manner in which the action of the heart and the pulse at the wrist were prolonged after the respiration had completely ceased. This the author referred to death being caused by compression of the *medulla oblongata,* and the consequent annihilation of the respiratory act, while the heart's action being less completely under the action of that portion of the nervous centre, only ceased in consequence of the circulation through the lungs becoming obstructed.

2. In this series of cases death resulted from asphyxia, but the means by which this was brought about varied greatly. The pathological states giving rise to death were referable to, 1*st*, Obstruc-

tion to the respiration caused by purulent infiltration and œdema of the glottis. The patient was a hale powerful man, 69 years of age, apparently in a state of perfect health till the moment of his seizure, with the exception of occasional dyspnœa. He suddenly dropped down and was dead in five minutes. *2d,* Death occurred in three cases from exclusion of air from the cells and tubes of the lung by effused blood. In these cases death did not result from the amount of the hæmorrhage, but from the blood being drawn from the bronchial tubes into the cells of the lungs, and so causing asphyxia. The causes of the hæmorrhage differed in each case. In one there were distinct marks of inflammation of the base of the left lung, and one of the blood-vessels there had given way after unusual exertion in climbing a stair, the person being heavily laden after a full meal, and having unusually large abdominal organs. The second was a phthisical case, and a blood-vessel gave way while straining at stool. In the third case the hæmoptysis appeared to depend on disease of the valves of the heart. *3d,* Death occurred in two cases from compression on the large thoracic blood-vessels and bronchial tubes by enlarged bronchial glands and accumulation of fat; and in a third from enlarged thymus and thyroid glands. *4th,* In one case death resulted from emphysema diminishing the amount of respirable lung. Several of these causes were aided by circumstances favouring the accumulation of blood in the right heart, as full meals, flatulent distension of stomach and bowels, over-exertion, &c.

3. Five cases occurred in which death seemed to result from the occurrence of syncope. The morbid appearances consisted in two cases of compression of the heart from effusion of blood into the pericardium. In one case this arose from the bursting of a small dissecting aneurism of the aorta, and in it the posterior coronary artery, in consequence of the anterior being obstructed by atheromatous deposits, was enlarged to the size of the aorta itself. In the other case the effusion arose from a rupture of the left ventricle, which was dilated and somewhat hypertrophied. In this case the death was instantaneous. The notes of this case were deficient as to the state of the muscular structure of the heart; but as the aorta was dilated, rigid, and beset with osseous deposits, and the aortic valves were also rigid, and the body was loaded with fat, the author thinks it likely that the muscular structure had undergone the steatomatous degeneration. In another case it seemed difficult to account for the cause of death. The heart was unusually large, and filled, as well as all the arteries, with clotted blood. The aorta and arteries of the brain were inelastic, dilated at intervals, covered with atheromatous and osseous deposits, and the brain was filled with numerous small cavities, the result of white softening, resembling exactly the cavities

in Parmesan or Stilton cheese. The man was apparently quite healthy previous to his death. In two cases death resulted from aneurism of the aorta. In the first the aneurism was so large as to have caused the absorption of portions of the sternum and of three vertebræ. In this case the sac had not burst; but the man having attempted to cut his throat with an old rusty knife, fell down and instantly expired. The skin of the throat was scarcely divided and no blood flowed. In the other case the aneurism burst into the pleura and produced instant death.

4. In the epileptic cases chronic arachnitis was recognised in one, and a fibrous tumour beneath the *dura mater* in the other.

5. In this case the cause of death was not apparent. All the organs seemed healthy. The only thing unusual was the occurrence of eight or ten of the *Ascaris lumbricoides* in the jejunum and ileum.

*Account of a specimen of partial fracture of the neck of the thigh bone, and of the proper source of nutrition of the head of the bone.* By T. Wilkinson King.—A man, 72 years of age, survived an injury to his hip fifty-four days. The neck of the left thigh bone was found nearly divided by fracture at its narrowest part. All that seemed to retain the fragments in union was less than one-third of the shell superiorly and anteriorly. The head was deflected backwards, and the buttress of the neck, which was too thin, was driven into the cancelli about the third of an inch. The only trace of new ossification was a point on the base of the buttress. Mr King, after alluding to three similar cases of partial fracture described by Dr Colles of Dublin, directs attention to the situation of the nutrient artery of the head of the femur. This artery, a branch of the internal circumflex, enters a foramen a little behind and below the highest point of the neck of the femur; after this it curves over the denser layer of cancelli left by the union of the epiphysis to the shaft, and directs its course beyond the insertion of the round ligament. This vessel consequently occupies the situation of the greatest immunity from violence, and if only a little periosteum about it escape division, when complete fracture occurs, it is left entire to sustain the vitality of the disunited head. In all cases of partial reunion Mr King has found this vessel uninjured. Mr King, therefore, concludes that the nearer the fracture is to the head of the bone the less chance there is of re-union being effected, as there is the greater danger of injuring the nutrient artery.

*On the pathology and treatment of fracture of the neck of the thigh bone.* By Bransby B. Cooper, F. R. S.—Mr Cooper corroborates the opinion of Sir Astley Cooper, that re-union of fractured neck of femur never occurs when the fracture is complete and is within the capsule of the joint, but only in those cases where the fracture is incomplete and the periosteum of the neck has not been torn through. Even in this case it is excessively tedious. He shows that all mechanical means must fail to secure perfect apposition of the fractured extremities, and that the causes of non-union are not to be referred to the want of suitable apparatus, but to the low condition of the reparative powers consequent on advanced age, to the remarkable changes which the hip-joint undergoes from age, and to the peculiarities of its original structure.

This accident is peculiar to old age; and if an old thigh bone be examined it will be found that the neck, instead of branching off from the shaft at an angle of 45° is found depressed to the level of the *trochanter major*, forming a right angle with the shaft, besides being much shorter than in youth. In addition to these changes the neck and epiphysis become much more brittle than in youth; and Mr Cooper, by a comparative analysis, found that this depended on these parts containing a lesser amount of earthy matter than they do at an earlier period of life. In fact, their brittleness depends on a loss of earthy matters, and not on an increase, as is usually supposed. The following table, containing the average results of his comparative analyses, is too important not to quote entire.

*Average.*

| | | | |
|---|---|---|---|
| I. | Fractured necks of femurs yelded per cent of bone earth, | 23.9 | |
| | Shafts of same bones, . . . | | 50.1 |
| II. | Unfractured necks of old bones not buried, . | 33.5 | |
| | Shafts of same bones, . . . | | 55.5 |
| III. | Unfractured necks of unburied bones of middle aged persons, | 50.1 | |
| | Shafts of same bones, . . . | | 56.7 |
| IV. | Unfractured necks of old bones very dry, or exhumed, | 61.4 | |
| | Shafts of same bones, . . . | | 64.9 |

These experiments, then, satisfactorily prove that the fragility of the neck of the femur of the aged depends on the very same cause as the fractures so liable to occur in the person suffering from malacosteon or rickets—viz. diminution in the amount of earthy ingredients. Mr Cooper, therefore, thinks we ought never to expect bony union in such fractures; that we should discard as useless all mechanical contrivances, and, instead of confining the patient to bed, use such means as will improve his health and strength, and prevent his falling a victim to irritation and confinement.

*On Paracentesis Thoracis—additional cases.* By H. M. Hughes, M. D.—In this paper Dr Hughes narrates in detail, or shortly alludes to several additional cases in which *paracentesis thoracis* was once or oftener performed. These, with those formerly performed, amount to 25. Of these, 13 recovered, in so far as regards the effusion into the cavity of the pleura. Two partially recovered; one of them after seven years had still a fistulous opening into the pleural cavity, the other had still a small quantity of fluid in the pleura. Ten ultimately died of the diseases connected with that for which the operation was performed; but death was not in any case caused by its performance. Of the ten fatal cases, six died of phthisis; one of gangrenous pulmonary abscess of opposite side; one of chronic pneumonia; one suddenly with pneumothorax in opposite pleura; one of pneumonia pericarditis and pneumothorax with effusion.

*Case of Popliteal Aneurism.* By John Nottingham, M. D.—The only interest attached to this case was the opportunity of inspecting the diseased structures, which was afforded a few months after recovery from the operation of ligature of the femoral artery. The person was 43 years of age; the operation was performed on the 14th October 1844; he returned to his occupation the beginning of January; and died of *delirium tremens* on the 26th of the same month. The tumour in the popliteal space was of the size of a very small orange, filled with fibrin apparently in three layers, that next the artery of a pale straw-colour and firm in consistence, that towards the surface much softer and of a dark colour, the middle portions being of medium consistence and colour; close to the artery a small cavity still remained, about the size of a walnut. The vein was lodged in a groove on the back of the tumour, but the nerves were stretched tense over it. The artery opened into the aneurism from the front, its coats appeared to be healthy, excepting immediately below the opening, where the internal coat presented a red appearance. Above the ligature, which was applied immediately above the part where it was crossed by the sartorius muscle, a plug of organized lymph one inch and a quarter in length was found; while the plug below the ligature measured two inches. Between this and the aneurism the artery was pervious. The ends of the divided artery were about half-an inch asunder, and imbedded in a mass of dense cellular membrane. The arteries generally were healthy, as was also the heart.

*Case of poisoning by Opium.* By Alfred S. Taylor.—To a child 14 months old, there had been administered at intervals about three and a-half tea spoonfuls of a weak watery solution of opium. The child died in eighteen hours, comatose, with stertorous breathing, and convulsions of the hands. No traces of the poison could be detected in the stomach or other organs of the body.

Mr Taylor takes the opportunity of commenting at some length on the best tests for the detection of morphia and meconic acid, but for the minute details on this subject we must refer to the paper itself. It may, however, be stated, that Mr Taylor considers the solution of sesquichloride of iron such a delicate test of the presence of meconic acid, that if it does not strike a dark red colour with the suspected fluid, after it has been diluted if coloured, and rendered neutral, he considers it vain to search for opium in the suspected fluids. The red colour, the permeconate of iron, is not destroyed by the addition of a few drops of solution of corrosive sublimate. The paper is well worthy of a diligent perusal by those who devote themselves to medical jurisprudence.

*Case of poisoning by Hydrocyanic Acid.* By Alfred S. Taylor. A commercial traveller was found dead in his bed at an inn, the body lying in the natural posture of rest, with the clothes drawn smoothly up to the shoulders. There had evidently been no struggling; the hands were not clenched; nor was there any appearances indicative of convulsions before death. The countenance was placid but very pale; the eyes open and particularly bright; the lips purple and retracted so as to show the teeth and part of the gums; and about the mouth there was the odour of prussic acid. On a chair at the back of the bed, but close to it was found a phial with a cork in it. This phial had probably contained prussic acid mixed with essential oil of lemons.

The brain and its membranes were healthy in every respect. The fluid in the ventricles was less than usual, and exhaled a strong odour of prussic acid. The lungs were healthy, but their lower parts were full of dark-coloured muddy-looking blood. The heart was healthy, contained very little blood, but of a muddy look, and strongly smelling of prussic acid. The liver was larger than usual, and had several spots of medullary deposit on it. The spleen was of a bright violet-purple colour. The urinary bladder was natural, contracted, and contained no urine. The stomach contained more than half a pint of a viscid fluid, having a strong odour of prussic acid. A portion of the mucous membrane at the greater curvature was highly injected, and of a deep red hue. The intestines were generally healthy; but the mucous membrane of the duodenum was inflamed in patches. On being slit open they exhaled a strong odour of prussic acid.

It was twelve days before the stomach and its contents, along with the phial, were forwarded for chemical analysis, by which time no prussic acid could be detected by any test, not even by smell.

The interest in this case depends on there having been no shriek heard, nor any symptoms of convulsions apparent, and on the person having had time after swallowing the poison to cork and lay down the phial on the chair at the back of the bed, turn round, lie down, and pull up the clothes over his shoulders. Many interesting remarks are made on these and other points of interest connected with this case.

*Trial for Murder by poisoning with Arsenic.* By Alfred S. Taylor.—Thomas Jennings was charged with the murder of his infant son, a child three years and eight months old, by administering to him arsenic on the 23d December 1844. It appeared that the prisoner, with a girl and his four children, dined on the Monday before Christmas day on potatoes, when the prisoner rose and brought a pinch of a white powder, which he laid on the edge of the plate out of which his infant son was eating. The boy dipped his potatoes in it, and swallowed the whole of it Half an hour after dinner the boy complained of pain in his belly, the next day he was very sick, and vomited, and Christmas day he died. The child was dead before medical assistance was sent for.

A fortnight after this another of the children was suddenly taken ill and died. The body was examined, and presented marks of inflammation in the stomach and intestines. A rough analysis of the contents of the stomach was made, but no poison was recognised. The child was therefore buried. A small portion, however, of the contents of the stomach having been forwarded to Mr Taylor, he clearly discovered arsenic in it. Suspicion was thus excited that the first child had also died from poisoning, and an order for disinterring the body was procured twenty-eight days after interment. Decomposition had made but slight advances. The viscera were distended with air, and presented patches of a deep red colour externally, especially on the duodenum. The central portion of the mucous membrane of the stomach was of a greenish-brown colour, but at the cardiac and pyloric ends, and along the greater curvature, it was of a deep cinnabar red hue. The pyloric orifice was pale. Near the cardiac extremity, and about an inch above the greater curvature, was a long irregularly oval patch, of a deep mustard yellow colour, about an inch in length, and less than half an inch in width on the mucous membrane. This yellow matter was closely intermixed with husks of raisins, and the mucous membrane was found ulcerated below and around it. Hard white solid particles were found scattered over the surface of the stomach. They proved to be composed of fat. About two drachms of a reddish-coloured thick fluid were obtained from the stomach. Husks of raisins and currants were also present in the stomach. The mucous membrane of the duodenum was of a deep red colour, and the mucous glands were considerably enlarged. Patches of redness were noticed over the small intestines.

On analysing the fluid contents of the stomach, distinct traces of arsenic were obtained. On drying the solid contents distinct crystalline-looking particles were observed on them, which were volatilized by heat, and proved to consist of arsenious acid. The estimated quantity of arsenic discovered in the stomach was from five to six grains; and Mr Taylor remarks, that about two or three grains would probably be sufficient to kill a child of this age. The prisoner was found guilty and executed.

*On the Action of Digitalis, and its uses in Diseases of the Heart.* By William Munk, M.D.—This paper is valuable, as containing the results of upwards of 400 experiments on the human subject. They were made during a period of about five years, during which Dr Munk was connected with dispensaries for the relief of the poor. In 184 cases the digitalis was exhibited strictly by itself, the powder being given in sugar, or tragacanth powder, or made into pills with bread crumb, the tincture or infusion being given in water, or cinnamon or peppermint water. This was the only mode of ascertaining the true action of digitalis, because no medicine has its effects more modified by combination with other drugs than digitalis. Dr Munk found that the two essential properties possessed by digitalis were those of a sedative and those of a diuretic. The first was most certainly produced by the exhibition of the tincture, the latter by that of the infusion. The powder appeared to be the least manageable and most uncertain of the preparations of digitalis, while the extract appeared to be of little or no value. It is to the fact of certain practitioners having employed one form of digitalis only that Dr Munk attributes the discordant results arrived at—one believing it exerts no action on the heart, the other, no action on the kidney.

Whenever, therefore, the sedative action of digitalis was desired to be developed, Dr Munk employed the tincture, and he found that the heart was affected in two different ways by it. These he denominates the sedative and the anti-spasmodic. Both of these were equally well marked, but to attain them very different modes of administration became necessary.

The depressing action of digitalis is that which it is most desirable to produce in simple and concentric hypertrophy, and is the action alluded to by M. Bouillaud as "incontestably the most efficacious and direct of all sedatives—the true opium of the heart." In this disease an increase of the impulse is the prominent symptom, from which much of the patient's sufferings either directly or indirectly arise, and as hypertrophy, with perhaps pericarditis and endocarditis, are the only diseases of that organ where it is desirable to produce the depressing action of digitalis, it is in these only that digitalis can be administered so as to produce this effect. To induce this, the tincture should be administered alone in tolerably full doses, from 10 to 30 minims, every 8, 10, or 12 hours; and Dr Munk found that combining it with hydrocyanic acid, colchicum, hyoscyamus, conium, acids, &c., only tended to prevent it developing its full depressing powers.

But it is the antispasmodic effects of digitalis which are so useful in cardiac disease. This is especially the case wherever excitability or irritability occur. This state is evidenced by tumultuous action, by palpitation, irregularity, or intermittence of beat, one or more of which occur in almost all heart diseases.

These symptoms, though coincident with, have no essential connection with structural change, and are much relieved by the employment of digitalis and other antispasmodics. Though the depressing effects of digitalis are most surely produced by giving digitalis alone, the antispasmodic effects are most certainly produced by combination of digitalis with camphor, assafœtida, galbanum, ammonia, or other antispasmodic drugs. Thus given, it rarely fails to quell the tumultuous beatings of an irritable heart, provided the impulse be not materially augmented; and exerts the most beneficial influence on palpitation, oppression, and distress in the precordia, relieves the hurry of breathing, and calms that irritability of body and mind so generally witnessed under such circumstances.

That this action was owing to the digitalis more than to the other drugs used, Dr Munk repeatedly satisfied himself by omitting the digitalis and continuing the antispasmodics, when he almost invariably found that the control over the action of the heart was lost. He also tried the effect of omitting the antispasmodics and continuing the digitalis, but then found that the depressing effects were produced, and not the antispasmodic. He, however, repeatedly observed that camphor and assafœtida excited a certain direct antispasmodic action over the heart.

Dr Munk, by attending to these rules, found that the action of digitalis on the heart might in every case be certainly obtained, and, what is of not less importance, maintained with perfect safety. Digitalis, however, almost invariably proved inoperative when administered in a plethoric state of the system. But after cautious blood-letting, low diet, and evacuant measures, which are the appropriate remedies in the more urgent cases, digitalis becomes a valuable adjuvant. Whenever gastric derangement occurs, digitalis proves inoperative either as a depressor or antispasmodic. Hydrocyanic acid must in this complication be substituted.

When administering digitalis so as to produce its depressing action, it is absolutely necessary to keep the patient in the recumbent posture. The action of the heart will often be increased by 20 or more beats on assuming the erect posture. Dr Munk states that it is unsafe in any case to reduce the beats of the heart below 60 in the minute.

The diuretic properties of digitalis are scarcely ever manifested when it acts as a sedative on the heart. Dr Munk, therefore, as the result of his own experiments, believes its diuretic properties are to be attributed to its direct operations on the kidney. Dr Munk corroborates the statements of Dr Withering as to the proper cases for the employment of digitalis, and also as to the fact that there is little chance of any other diuretic succeeding if digitalis fail. Thus it seldom succeeds in men of great natural strength, warm skin, or florid complexion, or those with a tight and cordy pulse. But if the constitution be feeble or broken down, the pulse feeble or intermitting, the lips livid, the skin cold, the belly soft and fluctuating, or the limbs anasarcous and readily pitting under pressure, the diuretic properties of digitalis follow in a kindly manner.

In diseases of the heart, diuretics become useful, both by diminishing the quantity of fluid already thrown out, or if this be not present, by diminishing the aqueous portions of the blood, thus lessening the heart's duty, and taking off the morbid tension of the vessels.

In hypertrophy it is very rare that digitalis can be administered so as to produce its diuretic action, for the conditions of tone which contraindicate its employent prove an obstacle to its efficient action on the kidney. It is therefore only when the fatal event is at hand that it could be administered, and then the sinking requires stimulants and not lowering remedies.

In dilatation, but especially in valvular disease of the heart, digitalis administered as a diuretic is the most valuable of remedies. Under its use the cough, dyspnœa, anxiety, and serous effusions rapidly diminish, or altogether vanish. In softening of the heart, however, though the symptoms present considerable analogy with those of dilatation, foxglove was found by Dr Munk to be inadmissible.

It was found that certain circumstances favoured the diuretic action of foxglove. Thus it was necessary to give it in infusion in doses of from half an ounce to an ounce every six or eight hours. Although the infusion in general has no sedative action on the heart, still further to prevent this action, Dr Munk made his patients take moderate exercise, keep the loins warm by means of a flannel roller or a warm plaster, and drink rather freely.

Dr Munk has never witnessed any very alarming effects from the continued use of digitalis; and from his extensive experience he asserts that when its sedative or diuretic effects are kindly produced, he never entertains any fear of an untoward operation. It is only when, after a few days' administration, that the required effects are not produced, that the medicine seems to accumulate in the system, and the patient runs the risk of experiencing its poisonous effects.

*Two cases of Labour protracted by insuperable rigidity of the os uteri.* By John C. W. Lever, M. D.—Dr Lever relates the history of two cases in which the *os uteri* was so rigid as not to yield to strong forcing pains, though aided by blood-letting, tartar emetic, and smearing the os with extract of belladonna. In the first case, which was protracted several days, the whole of the *os uteri* was separated by sloughing, and the patient, being afterwards seized with puerperal rheumatism, sank. No inspection was allowed. In the second case, after trying the effect of blood-letting, tartar emetic, and smearing the *os uteri* with extract of belladonna, the os was incised laterally, and the patient was delivered by the efforts of nature and recovered.

In commenting on these cases and similar ones related by others, Dr Lever states his reasons for preferring incision to dilatation, and the reasons for incising the sides and not the anterior or posterior lips of the uterus. In using dilatation he has found that the *os uteri* was almost constantly torn, and very often the patient sank in consequence of peritoneal inflammation. By incising the sides of the os uteri the danger of injuring the rectum or bladder is avoided, and there is less risk of serious hæmorrhage than if the lips wère cut through. A crucial incision he condemns as unnecessary in almost any case. Besides in many cases of difficult labour he has found the os torn, and then it was always at the sides. The incising the *os uteri* in this way is free of danger, but it ought never to be had recourse to till the usual remedies fail, only strict attention must be paid that it is adopted before any symptoms of collapse take place.

*Two cases of Extra-uterine Fœtation.* By Dr Oldham.—The two cases described terminated fatally in consequence of rupture of the large blood-vessels of the containing sacs, and the consequent extravasation of blood into the peritoneal cavity. The first case was one of tubal pregnancy. When advanced about twelve or thirteen weeks in her second pregnancy, Mrs K. 31 years of age, was seized with the usual symptoms of abortion, but by careful treatment these symptoms subsided. Ten days after this, after over-exertion and while straining at stool, she felt something give way within her, succeeded by intense abdominal pain and syncope. She remained in a collapsed state with tympanitic very tender abdomen, and died twenty-four hours from the attack.

The abdominal cavity was filled with clotted blood. The bowels were pale and exsanguine. The uterus was nearly as large as it usually is at four months' gestation ; its cavity proportionally large, and the interior lined with a highly developed deciduous membrane, about four lines in thickness and thrown into folds so as to cause it to fill the whole cavity of the uterus. The membrane was continued uninterruptedly over the Fallopian orifices, but thinned away at the cervix, and was not continued across the *os uteri.* The appendages of the uterus were more or less covered with false membrane. On the right side the Fallopian tube was distended to the size of an orange, was covered with false membrane, and many bands of lymph stretched from it to the ovary and uterus. This tumour or sac contained the fœtus, and had given way at its lower part, where it was crossed by several large veins. From these the fatal hæmorrhage had proceeded. The fœtus appeared between three and four months' development, and still remained enveloped by its membranes. The right ovary contained a *corpus luteum.*

The second case occurred in a woman 28 years of age. While engaged in washing she was seized with violent pain in the belly and back, immediately followed by collapse, sensation of sinking, &c. She considered herself about two months gone in pregnancy, but there was no external hæmorrhage to indicate abortion as the cause of these symptoms. She continued to sink, and expired eighteen hours after being seized.

The abdominal cavity contained about four pints of blood, partly fluid, partly clotted. The uterus was considerably enlarged, its parietes thickened, the muscular structure apparent, and blood-vessels much enlarged. The mouth of the uterus was plugged with mucus, and its cavity filled with an exuberant growth of deciduous membrane, which covered over the mouth of the Fallopian tubes, but thinned off at the *os uteri,* leaving that aperture free. No serum was found within the deciduous membrane. Just at the left horn of the uterus, as seen externally, was a loose flap of membrane marking the situation of a sac or cyst, which had been ruptured and given rise to the fatal hæmorrhage. This cavity was situated in the thickness of the walls of the uterus, and was covered over and connected to the ovaries and tubes of both sides by means of bands of lymph. This cyst was about the size of a small horse chestnut, but did not communicate either with the Fallopian tube or the arteries. It was empty, its contents having escaped, shreds of membrane alone remaining, which the microscope distinctly recognised to consist of the chorion. The left ovary was healthy, but contained no *corpus luteum.* The right ovary, however, contained a very large and distinct *corpus luteum.* The inspection not having been conducted by Dr Oldham the ovum was not found.

The singular circumstance in this case is the existence of a *corpus luteum* in the right ovary, whereas the ovum had been developed within the walls of the left cornu. Though the ovum was overlooked in the examination, no doubt could exist as to its having filled the abnormal sac, whose rupture tended to the fatal result. The difficulty is to account for the ovum getting into the left cornu from the right ovary. Dr Oldham supposes that as the right Fallopian tube had its fimbriated extremity completely obstructed and muffled by bands of lymph, while that of the left tube was free, that the left had performed the office of its fellow, and received the ovum from the right ovary.

*Select Clinical Reports.* By George H. Barlow, M. A. and M. D.; and *appendix to same paper*, by Dr Lever.—The first series of cases consists of a few very interesting ones of constipation, in three of which, including Dr Lever's, a *post mortem* examination allowed the seat of the obstruction causing the constipation to be detected. In the first case, in which the abdomen was much distended, the urine abundant, and very little sickness, the seat of obstruction was low down the gut in the sigmoid flexure of the colon. In the second case, in which there was sickness without abdominal distension, but suppression of urine, the seat of obstruction was seated in the jejunum, a distinct, soft, circular cord of recent membrane obstructing the gut towards the termination of the jejunum. In Dr Lever's case, in which there was sickness but no abdominal distension, the urine, however, diminished in quantity, the inferior and middle third of the duodemum were so far reduced in thickness that a common quill could not be passed.

In commenting on the cases narrated, Dr Barlow directs especial attention to the state of the urinary secretion as an index of the part of the gut at which the obstruction is seated. Thus, if seated high up the gut, the urine was in the cases described more or less suppressed; when seated in the great gut the secretion of urine was but little if at all affected. The same holds good with regard to the flatulent distension of the abdomen. When there is much distension the seat of the obstruction is low down the gut; when there is little it is seated higher up among the small intestines; and the amount of the distension in every case indicates, with tolerable certainty, the particular part of the intestine in which the obstruction is seated. Dr Barlow remarks that there is in general less early sickness when the obstruction is seated in the large intestines, and also less pain.

The only other case reported in the first series, No. iv., is one of ascites with scanty urine, in which, after the water was drawn off, it was discovered that the liver and kidney were diseased. Peritonitis followed the operation, and the patient sank the fourth day after the tapping. The liver was found large, myristicated, lightish-yellow, and firm. The right kidney was as large as four, and consisted of disorganized masses of fungus, tubers, and coarse tissue of red, brown, and yellow colours. From six to eight inches of the *vena cava ascendens* were filled with fungoid-looking masses similar to those observed in the kidney.

In Dr Barlow's second report, (No. vi.), are several cases of interest. The first two cases are those in which dropsical effusions resulted from the passage of blood through the lungs being impeded, and in them the secretion of urine was greatly diminished. Even, however, after the bronchitic attack and dyspnœa were relieved, diuresis was not freely induced until the bowels were freely moved by means of cathartics which acted briskly on the mucous membrane.

The next series of cases refers to dropsical symptoms resulting from some obstruction to the free flow of blood through the heart. In these cases likewise the urinary secretion was diminished. In the first of these cases the mitral valve was contracted and thickened, and the auriculo-ventricular orifice narrowed. Both auricles and the left ventricle were extremely dilated. In this case the pulse was wiry, hard, and intermitting, and a slight murmur attended the first sound. In the second case the heart was large, thin, pale, and soft; the mitral valve granular and fringed with vegetations; some of the cordæ soft, tumid, and ruptured. In this case the pulse was unequal and feeble, but never intermitting. In both these cases a rasping or murmuring sound accompanied the first sound of the heart. In the third case the heart was large, both ventricles being dilated and hypertrophied. The aortic valves were rigid, contracted, and evidently admitted of regurgitation. The other valves were healthy. In this case the pulse was full and splashing. A rasping murmur attended each sound of the heart, being also traceable along the course of the aorta, but that attending the second sound was the loudest.

In commenting on these cases Dr Barlow notices the fact, that though in only one of these cases the mitral valves were very decidedly diseased, a more or less loud murmur accompanied the first sound of the heart. Unless, therefore, such a murmur be accompanied by other characters, it cannot be held to indicate disease of the mitral valve. These cases, however, in his opinion, corroborate the opinion of Dr Hope, that the pulse not only substantiates the physical signs, but indicates the degree of the valvular disease. Thus a decidedly jerking pulse denotes a free aortic regurgitation, and a decidedly weak and irregular pulse bespeaks great mitral contraction or free regurgitation. To the above cases he adds the notes of two others in which the same correspondence was observed. The intermission, again, of the pulse, as it occurrs both in cases in which there is mitral disease, as well as in those in which there is none, leads Dr Barlow to the conclusion, that it must be produced by a deficient supply of blood to the left ventricle; a state which may be caused by obstruction to the pulmonary circulation, as well by causes external to the heart as by disease of the mitral valve. It would also be more likely to result from narrowing of the auriculo-ventricular orifice than from defect of the mitral valve.

The last case related in these reports is a case of structural disease of the kidney, where death took place by coma.

*Reports of Cases of Injury to the Abdomen.*—In this report of cases occurring in the wards of Guy's Hospital are many of great interest; but as our space will not permit us to go over these individually, we shall content ourselves with indicating their nature. The first seven cases are those of general injury to the abdomen, five of which recovered and two died. There are three cases of wound of the abdominal parietes with protrusion of the intestine, or omentum. The first case recovered. The second, in which the omentum protruded, was attacked with peritonitis and died; and the third, in which the colon was protruded and lacerated, without any urgent symptom having occurred, sunk in about 48 hours after the receipt of the injury. Four cases are recorded of ruptured intestines. Death took place in all in from 20 to 48 hours. Seven cases are narrated of laceration of the liver, in one case complicated with rupture of the stomach, in two others with laceration of the kidney. In these cases death took place either immediately after the accident or within a few hours; one case, however, survived 18 hours; none recovered from the state of collapse. Two cases of laceration of the kidney occurred. One after the fatal blow which occasioned this had only time to stagger forward a few yards when he fell and expired. The other lived 27 hours. Three cases were admitted with ruptured spleen, and one with lacerated spleen and ruptured bladder. One died in a few hours; the second in 17 hours; the third lived 12 days, and the last two days. In all these cases of rupture of one of the abdominal glandular organs, the effusion of blood seemed to be the chief cause of death, from a quart to four or five pints of blood having in almost every case been found effused into the abdominal cavity. Three cases are narrated of ruptured bladder. In them death occured at various intervals of 18 hours, 53 hours, and three days. Death in these cases seemed to result partly from peritonitis, the result of the rupture, partly from the effusion of blood.

*Reports of Cases of Diseases of Children treated at Guy's Hospital in* 1843-4, with remarks by Golding Bird, A. M. and M. D.—We are pleased to see the more interesting cases of disease which occur among children reported in this excellent periodical.

From October 1843 to January 1845, 830 children were treated as out patients; of these, however, 75 were admitted into the hospital, and it is on these that Dr G. Bird comments. The present report is confined to cases of remittent fever, croup, infantile syphilis, and scarlatinal dropsy.

After narrating four cases illustrative of the different forms which infantile, remittent or gastric fever assumes, Dr Bird makes some very apposite remarks on that disease. Under the general term infantile remittent, gastric or worm fever, he thinks authors have confounded two distinct affections, one depending almost entirely on derangement of the functions of the gastro-intestinal tube; the other upon more or less distinct malarious influence. He might have added a third, which is the most common cause in children two years old and under, viz. the irritation of teething, unless indeed he includes this also under the first head. The true remittent fever prevails as an epidemic, and is most prevalent during spring and autumn, the autumnal form being usually the most severe. Almost all the cases of true remittent fever occurred among families residing at Bermondsey, Rotherhithe, Deptford, and other places sufficiently near the banks of mud left by the Thames at ebb tide, to explain its dependence on malarious influence. Indeed in the autumn of 1843, when it was particularly prevalent, it existed contemporaneously with ague, many cases of which occurred among adults in the same situations. As to the diagnosis of the true remittent fever Dr Bird conceives there is no great difficulty. Its attack is usually sudden, prostrating the powers of a previously healthy child at once; whereas in gastric fever the symptoms come on gradually and insidiously. In remittent fever, too, there is little or no gastric irritation or abdominal distension, while the exacerbations are more intense, and the remissions almost complete.

The treatment found most successful was cutting short the hair, daily sponging the body, correcting the state of the bowels by a dose of *hydrarg. c. creta* at night, and castor oil next morning, followed by the carbonate of soda in small doses. As soon as the state of the secretions was corrected, the tongue free of fur, and the exacerbations distinctly marked, quinine was administered, and rapidly exerted its specific and curative effect even in the most severe cases. In no case was the quinine ever given till the remissions were well marked, and whenever this occurred it never failed. In many cases where the remissions were not well marked a brisk emetic caused them to become evident, and allowed the quinine to be administered.

The common infantile gastric fever was in general easily cured by clearing out the bowels by means of three to eight grains of the *pulvis sodæ compositus* at night, followed in the morning by a full dose of the *pulvus rhei salinus.* The *pulvis sodæ compositus* is composed of dried carbonate of soda five drachms, calomel one drachm, compound powder of chalk ten drachms. The *pulvis rhei salinus* consists of one drachm of rhubarb with two drachms of the sulphate of potash.

Three very interesting cases of croup are related. The first was a case of acute croup treated successfully by the hot bath, leeches, emetics, solution of tartar emetic, and mercury so as to affect the system. The greatest benefit was derived from heating the apartment by means of a stove, a practice which we have found of inestimable value in all cases connected with disease of the larynx or bronchi. The second case was excited by a child swallowing acetic acid. This case was brought to a successful termination by means of the sulphate of copper given as an emetic. The third case, communicated by Dr Hughes, was one in which croupy inflammation occupied the whole extent of the air passages, but was complicated with pneumonia. The lad, 15 years of age, expired the day after his admission to the hospital. The lining membrane of the larynx and trachea was highly injected, in some places going the length of presenting ecchymosed spots. The whole was lined with a firm fibrinous layer. The left bronchus was filled with soft albuminous matter, inclosed by a firm and distinct layer of fibrin, which extended to the tubes of the second and third size in the upper lobe, but to the most minute ramifications of the tubes in the lower lobe of the lungs. The lung itself was in the upper lobe emphysematous, in the lower had undergone the pneumonic red consolidation. The right bronchi and lung were less affected than the left. The smaller divisions of the tube were in particular less obstructed, excepting in about one-third of the lower lobe and a regularly defined spot in the upper, where the tissue had undergone the red hepatization. The centre of the hepatized spot in the upper lobe had a darker colour, softer consistence, and presented the appearance of pulmonary apoplexy.

The cases of syphilis in infants present nothing peculiar, and all rapidly recovered under mild mercurials, iodide of potassium, and sarsaparilla.

The dropsy following scarlatina was very prevalent during the autumn of 1842–3. In most the anasarca showed itself within a week or two of the disappearance of the eruption. In many the œdema was so great that they were quite blinded for a time from the effusion into the loose cellular tissue around the eyelids. Not a single case, however, proved fatal; all yielded to the warm bath, flannel clothing, the internal administration of antimony and acetate of ammonia, with syrup of poppies, and an occasional dose of mercury with chalk. Albuminous urine was remarked in most cases, and not in others. From the circumstance of cases of dropsy after scarlatina occurring much more frequently among the poorer classes, Dr Bird thinks there can be no hesitation in regarding arrest of the functions of the skin, or rather the non-establishment of free perspiration, as the most serious exciting cause of the dropsy. The œdema almost constantly disappeared with the appearance of sensible perspiration on the surface, and the disappearance of albumen from the urine. The little patients were almost always left remarkably pallid and anæmiated, but rapidly recovered their health and strength by the employment of preparations of iron.

This paper is concluded with some remarks on the specific action of alum in pertussis. Having employed this remedy extensively in that disease for the last three years, Dr Bird considers it a most valuable remedy in one stage of that disease; if employed in any other it will lead to disappointment. In the first or inflammatory stage of hooping-cough, all specific remedies will be avoided as that stage must be treated as one either of catarrh or of acute inflammation. It is in the second or nervous stage that much benefit may be derived from the employment of alum. In this stage the acute inflammatory symptoms have subsided, the skin is tolerably cool, and the tongue clean; but the cough is still severe, and accompanied by a copious secretion of viscid bronchial mucus. In such circumstances the alum has answered more satisfactorily in Dr Bird's hands than any other remedy, giving marked and rapid relief. From two to six grains were given in a mixture every four or six hours. The formula was the following: Alum 25 grains, extract of hemlock 12 grains, syrup of red poppies 2 drachms, dill water 3 ounces. Mix. A dessert spoonful every sixth hour. This medicine never constipated the bowels, nor produced any disagreeable effects.

The remaining papers contained in these three Numbers of Guy's Hospital Reports consist of Half-yearly Reports of the Clinical Society, Reports of Cases of Injuries to the Chest, and Medical Reports from the Books of the Clinical Wards. On these our space will not allow us to enter; but among these will be found many cases of interest, both as regards the symptoms produced, the morbid appearances, and the effects of the medical treatment.

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ART. III.—1. *On the Analysis of the Blood and Urine, in Health and Disease. With Directions for the Analysis of Urinary Calculi.* By G. O. REES. London, 1836. 8vo. pp. 147.

2. *On the Analysis of the Blood and Urine in Health and Disease; and on the Treatment of Urinary Diseases.* By G. OWEN REES, M. D., F. R. S., Fellow of the Royal College of Physicians, Principal Medical Officer to the Pentonville Prison, Assistant Physician to Guy's Hospital, and Physician to the Caledonian Asylum. Second Edition. London, 1845. 8vo. pp. 218.

THE first edition of this work appeared in 1836; and in no long time acquired the character of a precise and accurate treatise on the chemical history of the blood and the urine in health and disease, and a useful and judicious guide in explaining the best methods of conducting the analysis of these two important fluids.

Upon that performance the present edition, which appears after an interval of nine years, is a very great improvement. The author has not only carried forward the analytical methods and processes to the present time, and presented an accurate view of the state of knowledge on the chemical constitution of the blood and urine in health, and when the system is under the influence of disease, but he has added a very useful condensed view of the principles which should regulate treatment in urinary diseases.

The chemical labours of Dr Prout, and especially the instruction communicated in the two last editions of his excellent work, have been of the greatest service in directing the attention of physicians to the state of the blood both in health and in many diseases. A considerable amount of rather vague information was diffused among the profession as to the morbid states of the urine, the influence of disorders of the digestive organs in producing them, and the necessary conclusion, that in several of these the blood could not be in a healthy state. By giving this knowledge a degree of precision previously unknown, and by showing how it could be applied in the management of these diseases, Dr Prout rendered a great service to chemical pathology, and showed physicians means by which agents and instruments already in their hands, but too often indiscriminately, erroneously, and unsuccessfully used, might be made to produce beneficial results with greater certainty and precision, than had been hitherto obtained from them. This example has further brought into the field a number of active and intelligent followers, who have in different modes contributed much to improve this department of physiological and pathological knowledge.

Among these able disciples of an accomplished instructor Dr Rees holds a distinguished place; and the present short treatise may be regarded as a useful companion to the work of Dr Prout. The work is constructed upon the plan of the first edition. It may be said to consist of three divisions; the first devoted to the chemical history and analysis of the blood; the second devoted to the chemical history and analysis of the urine; and the third to the treatment of urinary diseases. Then follows an appendix, as in the first edition, but enlarged, and embracing several points and subjects which could not be conveniently introduced into the body of the treatise.

We do not propose to go into a detailed analysis of the contents of this treatise, because we wish that every student and every practitioner should employ it as a chemical manual. It is sufficient to say, that the descriptive details given by Dr Rees are conveyed in a perspicuous and intelligible manner, and show that he is perfectly conversant with all the most improved analytical methods, and can describe them in that plain and simple manner, which must make the student comprehend every step as he proceeds. We believe that to most beginners in the study of chemical pathology and animal chemistry, the great difficulty consists in the idea of the complexity of the processes. There is no denying that in some instances the processes are complicated; and that difficulties from this source, very perplexing, often arise. Yet they are more in idea than in reality; and with a clear guide like the present they must be very trifling. We recommend the student to make a beginning with the treatise of Dr Rees before him; and the difficulties he will find gradually disappear as he advances.

Though the first two portions of the work contain information quite indispensable to the student of chemical pathology, and the practitioner who is ambitious to rise to the philosophy of his art, yet the third part is that which will be perused with most interest by all orders of medical readers. This presents a short condensed view of the leading morbid states of the urinary secretion, whether idiopathic or symptomatic of other affections, and of the appropriate therapeutic measures required in each.

The subjects of which the author treats are lithic acid deposits, phosphatic deposits, deposits of oxalate of lime, albuminuria in its acute and chronic forms, the presence of chylo-serous urine, diabetes, and excess or deficient secretion of urea.

The appendix contains a correct view of the present state of chemical knowledge, or the changes presented by the blood in various diseases, as ascertained by the best authorities; and various important facts illustrating the deviations in the urinary secretions. Much of this is entirely new; especially an essay by the author for the Guy's Hospital Reports, on sources of error in ascertaining the presence of albumen in urine, and the best means of obviating them.

In conclusion, this treatise may be regarded as a valuable guide to the student of chemical pathology, whether beginning or advanced; and as such we strongly recommend it to the professional reader.

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## ART. IV.—*Fruits and Farinacea the Proper Food of Man; being an attempt to prove from History, Anatomy, Physiology, and Chemistry, that the original, natural, and best Diet of Man is derived from the Vegetable Kingdom.* By JOHN SMITH. 12mo. London, 1845. Pp. 422.

QUESTIONS in physiology, which admit of only one answer,—an absolute affirmative or an absolute negative, a decided adoption of one side and an equally decided exclusion of the other, are among those which it is always difficult and sometimes impossible to answer in that manner. Such in a very considerable degree may be said to be the question, whether animal or vegetable food is the most proper for the human race?

Were the question simply, what is the most proper sort of food for the human race? then it might be possible to answer by specifying the articles, whether derived from the vegetable or the animal world, which observation and experience showed were most appropriate, and most readily fulfilled the various objects of food and nutriment. But when the question is proposed in the manner now alluded to, is animal food or is vegetable food best? it is clear that it is either impossible to give a positive answer on the one side or on the other; or, if an answer must be given, that it may be that neither can the one without the other be said to be always best; and it depends entirely on circumstances, whether the one should be used without the other, or in combination with the other.

This question, nevertheless, the author of the present volume has undertaken to answer; and indeed his whole treatise is written on the idea that animal food is improper, is hurtful and injurious, and that food derived from the vegetable world is the only safe species of nutriment which the human race can employ.

We do not attempt to conceal or to underrate the difficulties of the task which Mr Smith has undertaken. Scarcely, indeed, could we name one in mere physiology, and with such important and necessary relations to pathology, which is surrounded by so many difficulties, and embarrassed by so many contradictions. The question has occupied the attention of all physiologists; and many physicians. It has been a favourite subject with poets and philosophers; and yet in the present day it seems as far from being decided as ever.

The present author states four questions for consideration; 1*st*, what was the original food of man? 2*dly*, is he so wonderfully constructed that climate and locality alone determine on what substances he shall feed? or does his organization, like that of other animals, manifest a special adaptation to one specific kind of food, but with an extensive range of adaptability to the greatest variety of animal and vegetable productions? 3*d*, what is the best food of man, or what diet do science and experience point out as best calculated for promoting health, happiness, and longevity? *finally*, what seems designed to be hereafter the universal diet of mankind?

The author undertakes to show that there are data sufficient for enabling us to solve these questions; and he expresses the hope ultimately to prove, that fruits and roots, with other farinaceous and succulent vegetables, were the original food of mankind; that they are the natural and best food; and that hereafter they will become the universal food of the human race.

In order to answer these questions in a satisfactory manner, the author has collected, with great diligence and learning, an immense body of information from all sources; and if the questions may still be considered as only in part determined, it cannot be doubted that he has furnished readers with the most authentic means of deciding the point for themselves.

Mr Smith commences with a view of the food of the human race in the earliest ages; before the fall; after the fall; before the flood, and subsequent to that dreadful catastrophe; and he certainly makes it as probable as any inference of that kind can be, that mankind originally satisfied their appetites with the productions of the vegetable world alone. He thinks it utterly horrible, that the fair and innocent mother of the human race could have ever committed such an enormity as even to long for mutton or lamb, could have devoured a partridge, or eaten pigeon pye; and he leaves us to infer that it was only after she had eaten forbidden fruit, that she became a sort of carnivorous animal.

The whole of this argument, however, is excessively perplexing; and we think it scarcely possible, to determine the point absolutely from the testimony afforded by the sacred writings. In point of fact, testimonies on both sides may be deduced from the scriptures; and after all, the question always recurs, whether these instructions and directions are to be binding at all subsequent periods and on the whole human race?

The Israelites, and perhaps the Syrians in general, we admit, were a nation originally of shepherds; and on almost all occasions, except particular periods and seasons, their usual food was the milk of their flocks and such vegetable productions, as they could easily rear; and it appears to have been principally, when they were visited by strangers, that an animal was slain, in order to render the meal more abundant or more magnificent than common. It would appear also, that though the Israelites did use animal food in Egypt, yet in their journey through the desert, either it was understood that they were to confine their meals, except on the memorable occasion of the passover and its anniversary, to the milk of their herds and flocks,—bread, meal, and manna; or at least that they were neither often nor habitually to subsist on the flesh of animals. When they longed for flesh and got it, we know what followed—a great and pestilential mortality, whether caused by the excess, or by indulging in food unsuitable to the desert, or merely as a memorable and miraculous monument of the displeasure of God.

When they were completely settled in the land of Canaan, we know that they did become eaters of flesh, and that this was undoubtedly permitted by the Supreme Ruler.

But if such be the testimony of the sacred writings during the Mosaic dispensation, how much more forcible is it during the

Christian; and what is Mr Smith to say to the advice and exhortation given to St Peter, when he objected to eat, because the sheet let down from heaven contained all sorts of animals, clean and unclean, forbidden and permitted, and when the voice sounded in his ears, Arise, Peter, kill and eat. What is to be said of the passages in the epistles, in which it is quite clear, that it was not only understood, that man was to live on animal food, but that he was actually living on animal food without scandal or reprehension.

We must here observe, however, that of this application of the sacred writings to prove or disprove the justice and truth of principles and doctrines in science, we altogether disapprove. Many persons, who fancy themselves to be extremely devout,—persons, we daresay, with very good intentions, but exceedingly weak judgment, are never satisfied without appealing to scripture on behalf of the principles which they defend and the opinions which they entertain; and accordingly scripture is by them quoted liberally, and sometimes both absurdly and profanely. They never seem to think that the truths and directions in the holy scriptures were promulgated, not to teach mankind astronomy or geology, medicine, physiology, or politics, but to instruct them in moral and religious duties,—to teach them their duties to their Creator and to their fellow-creatures. They seem utterly to forget, that scripture has been repeatedly appealed to in this manner by ingenious hypocrites and dexterous but unprincipled persons, to defend the greatest iniquities and sanction the most enormous crimes. Although, therefore, we have, in justice to the author, allowed the argument from this source some consideration, it is our deliberate opinion that all arguments deduced from this source form most dangerous weapons, and are almost invariably and without exception hurtful both to the cause of religion and science.

In the second division of his treatise on the anatomical and physiological argument, Mr Smith, we think, is, if not more successful, certainly highly ingenious. He opposes the reasonings of all those physiologists who have, from the shape, number, and size of the teeth, the conformation of the jaws, the disposition, structure, and length of the alimentary canal, placed man among carnivorous animals; and he contends with Mr Lawrence, Mr Thomas Bell, and others, that, so far as the anatomical facts go, no conclusion can be drawn in favour of the idea that man is either carnivorous or omnivorous. On this subject the author has collected a large amount of information from various sources; and if by any means conviction of the correctness of his doctrines can be obtained, assuredly the facts and arguments here adduced will tend much to accomplish this object. We doubt, however, whether the anatomical argument can be turned to more decided account than any other; for certainly many physiological authors have deduced from the same facts very opposite conclusions. What, for example, is more commonly taught than that both the structure and the number of the teeth, and the arrangement of the parts of the alimentary canal show that man may at least subsist on all sorts of food, if he do not require animal food in certain situations and under certain circumstances? But as it is difficult, if not impossible, to communicate an exact idea of the force and value of these arguments, we think that the only way is for readers to peruse them carefully.

In the fourth or concluding chapter of this part, the author rather impairs the force of his reasoning by adverting to abuses and vicious methods of obtaining or preparing animal food.

Supposing animal food to be requisite to the support of the human race, it is surely not necessary, that in killing these animals, cruelty and torment should be added to privation of life. We know that, in point of fact, it is too frequently the case, that the animals prepared for the table are put to death under circumstances of considerable, sometimes very great cruelty; and we fear, that those, to whom this duty is assigned, are not naturally the most feeling or humane of the human race. Still the question may be asked, is cruelty a necessary adjunct? Is it indispensable that, in order that the bodies of animals be prepared for food to mankind, they should be deprived of life in a cruel and unfeeling manner, or that painful and lingering torture should be previously inflicted? Perhaps it may be said that all slaughter, all premature and violent death is essentially an act of cruelty; and the very circumstance of depriving sheep and oxen of life, in the midst of health and strength, is itself naturally the greatest and most outrageous cruelty.

This difficulty, we believe that it is utterly impossible to get over. So long as animals in health must be slaughtered for the purposes of food, and their bodies must be carefully and completely drained of blood, it is next to impossible to say that some degree of cruelty is not perpetrated. The very act of cutting the throat of an animal or thrusting a sharp instrument into its neck and large vessels, is and always must be an act of some degree of cruelty. And were this operation performed in the most gentle manner possible, even by Lambro himself, the mildest of cut-throats, the frequent repetition of the act must beget an indifference to animal suffering, which no person of any feeling could indulge.

It is nevertheless against all the manifold cruelties which are daily told of the horrors of the slaughter-house that the objections of Mr Smith are mostly directed. It is against the torturing of living animals, and against the dispositions which these scenes both indicate and are calculated to engender, that his objections are directed. Every person must admit that all unnecessary and gratuitous infliction of pain ought to be avoided; and that if these animals must be put to death, the act of depriving them of life ought to be attended with no circumstances of pain which can be avoided. Whether this would satisfy so decided an enemy to the sacrifice of animal life as the present author we cannot say. But were the rule adhered to, it would improve much the force of several of his arguments.

Let justice, however, be done in this question to all parties. Are the slayers of sheep and oxen the most deeply stained with animal blood? have they most to answer for in the infliction of cruelties on the lower animals? What shall we say of the sportsman, especially of those who find their amusement in the murderous scenes of the battue? What shall be said of those who slay 30 or 40 head of deer in one single forenoon; where the field is covered with blood and carnage; and where many harmless animals are violently put to death, and sometimes linger for a considerable time in the throes and agonies of the last struggles? All this seems gratuitous, factitious, and wanton, compared with the daily and weekly operations of the slaughter-house. The latter, we fear, is a necessary evil; the former looks more like indifference to animal suffering.

In the third part of his work, on the best food for man, the author takes a most elaborate view of the subject; and it must be allowed that he has spared no pains to collect facts and information from the best sources, and to apply them in establishing just conclusions. The subject is considered at length in seventeen successive chapters; and accordingly occupies the larger part of the volume. Though our limits will not allow us to present a full and detailed analysis, it may be proper to state the leading results at which the author has arrived.

The author first shows that vegetable substances contain the elements and qualities,—in short, the alimentary principles necessary to the nutrition of mankind; that vegetable substances have been used as food by many nations, and strongly recommended by many individuals; that according to the authority and testimony of many eminent physiologists and physicians, health is more certainly and easily maintained by fruits and farinaceous articles than by the use of animal matters; that vegetable food is quite sufficient to maintain physical strength and activity; that extremes of temperature are better endured on vegetable than on animal food; that food derived from animal or azotized matters is observed to be the main cause of many severe and intractable diseases; that the constant use of animal food causes gout, rheumatism, caries of the teeth, and other disorders; and that the use of diseased animals is poisonous; that, on the other hand, under the use of vegetable food, diseases are either rare or very manageable, or if present, they often disappear on the individual passing to a vegetable diet; that the use of vegetable diet is prophylactic against epidemic diseases; that vegetable diet is conducive to symmetry of figure, and normal development of all the organs and members; that the use of vegetable diet is conducive to acuteness and perfection of the senses, to true pleasure and enjoyment; that it is favourable to mental vigour and intellectual cultivation; that it is favourable to the due regulation of the passions and emotions, and to the proper development of the moral faculties; that its use is favourable to longevity; and that the influence of vegetable food upon population and the moral progress of man is more favourable than that of animal food.

Then follows a concluding chapter on the best mode of commencing a vegetable regimen, rules for the preservation of health, and some suggestions on articles most proper to be used as food and the best methods of preparing them, so as to insure their nutritious qualities and beneficial effects.

Such is a short sketch of the principal topics embraced by the present author in the discussion of the questions proposed, and in the general elucidation of the question as to vegetable food constituting the most eligible diet for the human race.

The author is evidently a person of great benevolence and good feeling, anxious to improve the condition of his fellow creatures; and, writing apparently from strong and settled conviction of the excellence of his cause, he evinces all that zeal and enthusiasm which overlooks objections and underrates difficulties. That he has in all respects established the propositions which he laid down, will not be admitted by all. That he will make many converts to his doctrines, we think doubtful. But that he is entitled to a fair, candid, and dispassionate hearing, is what every one must admit. The labour and diligence with which the author has collected information from all the best sources are exceedingly laudable; and there is no doubt, that to those who feel any interest in the subject, the book will prove instructive and amusing, and it will certainly enable them to judge of the merits of the mode of living recommended by the author.

The great objection that might justly be urged against the arguments adduced by Mr Smith, is that most of his reasonings, if not all of them, are directed rather against the abuse than the use of animal food, rather against animal food employed to excess, than against its moderate and temperate employment. It is impossible to deny, on the one hand, that food consisting of vegetable articles is quite sufficient to maintain health and strength; and that in many instances, both of nations and individuals, the habitual use of vegetable food renders the attacks of disease feeble and impotent. This, however, is chiefly applicable to man living in certain climates and in regions in which the use of animal food, either frequent, or constant, or abundant, there is reason to believe is hurtful. Thus it is observed, that in various tropical countries, for instance India, and various parts of Asia and Africa, whole nations subsist principally on rice, paddy, maize, and other grains with milk, and almost never taste animal food. The Arabs of the desert, a strong and hardy race, capable of enduring great labour and long continued exertion without sinking under it, subsist for weeks on dates, rice, barley and water. In truth, if these people obtain water alone with a few dates, it is astonishing how long they subsist in a state of health and vigour. Dr Rush, it is well known, preserved his health and energy amidst a very fatal yellow fever epidemic of Philadelphia by confining himself to diet consisting chiefly of vegetables, grains and milk, and excluding the flesh of animals in every shape.

Conversely, it is certain that Europeans who are accustomed to eat animal food in considerable quantity, and who continue the habit in tropical countries, in defiance of the customs of the natives, are attacked with fevers and inflammatory diseases in much greater numbers and with much greater severity than the natives. There appears, therefore, the strongest grounds for believing that this greater prevalence and more aggravated intensity of acute disease must be in some degree, perhaps in a very large degree, owing to the free use of animal diet, continued in climates and countries, to which that species of regimen is not well suited. It is also known that for many of the chronic disorders of tropical climates, especially hepatic and intestinal disorders, a ready and efficient remedy is found in the vegetable and farinaceous food of the natives.

It would be unreasonable, however, from these facts, to draw conclusions absolutely and positively against the use—the moderate and restricted use of animal diet. These facts prove at most, that the European habits are not suited to the tropical regions or those which border on the tropics, that the European, and especially the English allowances of animal diet are hurtful by excess, and may be productive of very considerable disease, and, we believe, of mortality. It is misapplication and misadaptation that are here the evils most hurtful, the practices most to be condemned.

Again, it is well known that the Italians and Spaniards consume much less animal food than either the English, the Germans, the Hollanders, or the Swedes and Danes. The Spaniards are particularly an abstemious nation as to the use of animal food. Part of this difference appears attributable to the climate, the appetite for animal food being much smaller in hot climates than in colder regions. It is also well known that the endemic fevers of Spain and Italy are greatly more violent and rapid than those of England and Germany; and though with both Spaniards and Italians they are less violent and more manageable than when English or German residents are attacked, and are often cured by keeping the patients on water diet for several days or weeks, yet no English patient could be trusted to such a mode of management; but in order to bring the disease to a favourable termination, blood-letting to a considerable extent and other evacuant remedies are required. All this seems to be connected with the different habits as to the use of animal food observed by different nations.

In short, while the constant and habitual use of animal food seems not admissible in warm climates and equinoctial regions; yet in temperate and cold regions it appears often to cause little injury. Men seem to thrive, and be vigorous, and healthy on it, and often, if it be not carried to excess, to continue free from disease. It is only, perhaps, when it is used too abundantly, and too frequently in the course of the day, that it appears to become hurtful. It is said also that the habitual use of animal diet gives a degree of strength, energy, and endurance, vigour, fortitude, and courage, which we in vain look for in the natives of countries fed principally or solely on vegetable articles. The advocates of this species of diet assure us, that the courage of the English sailors and soldiers depends altogether on their use of animal diet, and that the cause of all our victories by land and sea, from Cressy and Azincour down to the Nile, Trafalgar, and Waterloo, is to be sought in the life-giving properties of English roast beef.

It is never considered at the same time, how many violent and unmanageable diseases are engendered by this mode of living; how much the usual disorders incident to the animal frame are aggravated by it; and how much the mortality of both the navy and the army, especially on foreign stations, may be increased by the free use of animal diet. Is it quite certain that many of the inflammatory diseases, which are so frequent among the English, may not be in part produced, in part aggravated by the plethoric state and the tense condition of the vessels induced by this mode of life? Can it be said that paralytic attacks, apoplectic seizures, and various diseases of the heart, more especially hypertrophy, and the pneumonic and bronchitic attacks, so frequent and fatal in the army and navy, are not at least very much favoured by this mode of life? Haller remarked that, from an extensive collection of cases, it appeared, that persons remarkable for health and longevity had lived principally on coarse food, chiefly of vegetable articles, and food which, in the usual language, would be designated as poor, meagre, and innutritious; and it is not only matter of daily observation, but confirmed by all facts, that though the eaters of animal food seem healthy and vigorous, yet are they after a certain period of life liable to many diseases of inflammatory character, and are very usually cut off by some disease of inflammatory or hæmorrhagic nature, the approach of which a more spare mode of living might have either delayed or averted.

All this shows, we think very clearly, that it is chiefly the abuse of animal diet, the excess to which it may be and is too often carried, either in amount or by exclusive use, that is hurtful and to be avoided. The temperate and moderate use of it is probably, for it is not easy to speak on this subject with decision, free from harm, and in certain classes of individuals beneficial. Of this it may be said, as of many other things, that the Creator of mankind has provided the animal body with means of counteracting even and obviating the apparently hurtful effects of certain modes of living; and though we often see the effects of indulgence and excess, we often also behold even these extremes compensated for and resisted by the powers of the animal body itself.

What, then, are we to do? Shall we allow the use of animal diet, trusting solely to the conservative and compensating powers of the system, yet knowing that its use is pernicious? Or shall we forbid its use entirely, and say that it is not only unnecessary but that it is unsafe and calculated to aggravate greatly the violence of the diseases naturally incident to mankind, and to develope new and unheard of distempers? Are we to leave the sheep and oxen, goats and deer, turkeys and pheasants to possess the earth undisturbed, until they consume the whole of its produce? Of so great a revolution there is no chance nor any fear to be entertained. For extremes so violent there is no necessity. Plenty of people will always remain to use animal food of different kinds, and who may use it not only with safety but with advantage. But others there are, and these not few, who might safely live on the products of the vegetable world, with milk, and who would be all the better, for this species of regimen. To them it may be safe, if not necessary, to subsist mostly on the products of the vegetable world, which are fortunately multiplied, various, and abundant. The whole matter, in short, resolves itself into a question of national, tribual, or individual habits and tastes, pursuits, and occupations; and nations, tribes, families, and individuals may be safely allowed to decide for themselves whether they are to subsist on animal substances, or vegetable articles, or a combination of the two. In general all exclusive habits are bad. Exclusive animal diet is certainly much more hurtful than exclusive vegetable diet. But, probably, for the great body of the human race the union of the two, or mixed diet, is safest and in all respects most suitable. But if either man or woman find that even the use of animal food is hurtful, or leaves bad effects, or is not conducive to health of body and vigour of mind, such persons it behoves to subsist solely on the products of the vegetable world. We add, that we have known various persons who have been delivered from painful and obstinate disorders by giving up the use of animal food entirely; and others in whom disorders of the nervous system and the chest had been very much relieved by the same procedure.

The argument derived from chemical considerations we think of no great moment. It proceeds on the principle, that it is impossible to determine what is the proper food for the human race, until it is ascertained how much gluten, albumen, or starch, how much fibrin, gelatin, and osmazome is contained in each of the articles used as food, and in which articles these are most happily combined, in order to furnish food and nutriment. Were the human race never properly dieted till these facts are ascertained? Are we quite sure that these facts are, even at the present time, ascertained? Is it to be imagined that the Creator of the universe would leave a matter so important as that of the food of his creatures, to be ascertained by the chance of their becoming skilful chemists and expert analysts? Then it may be said, what has chemistry actually done, hitherto, at least, in enabling the human race to select the proper food from all the productions afforded for that purpose? We know that from this source great expectations of benefit and improvement are entertained. And so were they also entertained, when Count Rumford undertook to show that gelatin was a most nutritious article; that it could easily and copiously be obtained from bones; and that accordingly it was possible to feed three-fourths of the human race on the aliment obtained by digesting bones in hot water. Yet every person who can obtain any better species of soup than that prepared by the method of the learned chemist, agrees in pronouncing the latter most execrable.

If it be argued that this took place when animal chemistry and even all chemistry was rather in an infant state, we answer that matters do not appear to be much improved in this respect at the present time, when chemistry is believed to be very far advanced. What opinion can be formed, for example, of the judgment or common sense of the chemist, who gravely informs us that tea, coffee, cacao, and asparagus, are the food or nutriment of the liver, and best furnish the materials of the biliary secretion; that, in short, they contain the elements by the presence of which the liver is enabled to perform its functions? Or what are we to think when we are assured, that the alkaloid elements of opium and cinchona, namely, codeine, morphia, and quinine may be converted into constituents of brain and nervous matter; that these substances form a constituent of that matter (nervous), by the removal of which, the seat of intellectual life, of sensation, and of consciousness is annihilated. Such, nevertheless, are the doctrines taught by the Professor of Chemistry at Giessen;* and upon the grounds of this strange hypothesis, we are further informed, that we are to understand and explain the operation of these agents and various other narcotic substances on the animal body. It is possible that the professor is in the right; and if he is, it is certainly the most extraordinary, not to say marvellous identification of substances presented by the whole history of chemical science. The identification of diamond and charcoal is a mere trifle to it. We are, nevertheless, tempted to ask, how was bile formed in the human body before the introduction of tea, coffee, and cacao into Europe? Did the livers of the inhabitants of Europe not form proper bile before that time? And in what manner, again, may it be asked, are the brains of those persons to be nourished and sustained who take neither opium nor quinine, nor any similar alkaloid narcotic agent. Such are the fancies of chemistry when applied to dietetics, and the business of suggesting dietetic articles to the human race.

It is not very difficult to perceive also, from the numerous wild propositions lately brought forward by chemists and chemical counsellors as to the best method of cooking potatoes and counteracting the effects of the potato disease, that it is not from this quarter that substantial benefit can be expected to proceed.

We do not mean here to deny the value of those elucidations, which chemical science has afforded to the results obtained by experience and observation. These we regard as highly valuable. Here chemistry is in her proper position, explaining facts ascertained by long and multiplied experience. But it is remarkable that whenever chemistry, without practical experience, comes forward to give instruction in dietetics, invariably the instruction is naught and unavailing.

It appears further to be a matter of much greater consequence, to attend to the quantity and amount of food than to be very solicitous about its quality. Providing moderation is observed, it seems to be of little moment to those who are in health whether the food be of animal or vegetable materials; and even in many instances of disease, not acute, this seems to be a great indispensable condition. Dr Prout himself, unquestionably the most judicious as well as the most scientific writer on this subject in the present day, has stated it to be the result of his observation, as to the dietetic treatment of many gastric and urinary disorders, that he always observed that it was of little moment, to be particular as to whether the food was animal or vegetable, but of the utmost importance to attend to this condition, that, neither by great variety nor excessive quantity, any error be committed. One of the principal dangers, indeed, resulting from the use of animal food is that it is much more likely to be taken in excess than vegetable aliment; and as man is a cooking animal, the infinite variety of modes in which he has contrived to present articles of food, especially animal food, has tended to make to many their table a snare and a temptation to injure themselves.

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* Animal Chemistry, or Organic Chemistry in its application to Physiology and Pathology. By Justus Liebig, M. D., Ph. D., &c., Professor of Chemistry in the University of Giessen. London, 1842 and 1843. 8vo. pp. 354. Part II. 86, 87, 88, 89, 95.

Yet neither is variety in articles of food or the mode of preparation altogether to be condemned. If there be one point certainly established in the philosophy of dietetics, it is this, that a monotonous mode of living is hurtful, and that variety within certain limits, always attending to the use, and avoiding the abuse, is conducive both to good digestion and proper nutrition, to health of body and energy of mind. From the experiments of Dr Stark, and from the larger and more extensive experiments occasionally performed in prisons, penitentiaries, poor-houses, and hospitals, it seems to be well established, that a monotonous and unvarying species of diet long continued, especially if associated with confinement, is most hurtful to health, and is rarely adequate to maintain strength. Even the instincts of animals seem to lead them to shun an unvaried mode of living, and to seek change in certain circumstances. The horse, when long confined to oats, beans, or hay, longs for grass and green vegetables. The dog, when confined to animal food, occasionally shows his wish to change by eagerly seeking for grass.

The strongest argument in favour of his system, however, Mr Smith seems to have entirely omitted. This is, that, in point of fact, there is not animal food for all the inhabitants of the habitable globe. Moses could not understand how animal food could be provided for 600,000 persons for one month; and was constrained rather impiously to ask, "Shall the flocks and herds be slain for them to suffice them? or shall all the fish of the sea be gathered together for them to suffice them?" And assuredly without a miracle the thing seemed impossible. But if it were difficult, without slaying their flocks and herds, to provide animal food for 600,000 Israelites in the desert, how much more difficult must it be to do so to the nations of the earth, in the present more populous state of every country in the globe. In the long established and populous parts of Europe, there are not only not sufficient herds and flocks to provide the inhabitants with animal food even occasionally, but there is sometimes even a deficiency of the more easily obtained vegetable aliment. In Ireland it is certain that the cattle are by no means sufficient to provide the inhabitants with food even for a short time. In England and Scotland, with a population of 18,500,000, perhaps about one-half of the inhabitants obtain animal food; and in some parts, especially of the latter country, not one-eighth of the inhabitants obtain animal food.

Holland and Belgium appear to be the countries on the continent where, probably, a larger proportion of the inhabitants obtain animal food than in any other country in Europe. Yet even there it is very doubtful whether there are sheep and oxen to provide animal food for more than one-fourth of the inhabitants; three-fourths being either very sparingly supplied, or living wholly on vegetable articles of various kinds.

In France and Germany the supply of animal food in proportion to the population is still more limited. The great body of the agricultural and labouring population there subsist on rye bread, barley, maize, peas, potatoes, and similar articles; and the only articles of animal food which they ever get are milk, eggs, butter, cheese, and sometimes salted fish. In Germany the sheep are kept mostly for their fleece; and the proprietors do not feed them freely, as that injures the wool.

In Spain and Italy very little animal food is used by the great mass of the people. In the Lombard territories maize in different forms, and rice, with oil, milk if it can be got, and salted fish, form the staple articles of human food. The truth is, that all the sheep and oxen reared in Italy and Spain would not, if they were slaughtered, keep the inhabitants above a whole year. In the latter country the immense flocks of sheep are maintained chiefly for their wool; and they could not obtain food for these animals if they pastured them in one place the whole year; and hence in that misgoverned country prevails the great and unrivalled abuse of the Mesta.

In the eastern countries of Europe, as Russia, Poland, and Hungary, where the population is less dense, animal food might be more abundant; and in various parts of Russia certainly the working and agricultural population obtain animal food in greater proportion than in the more densely peopled countries. Yet even here it cannot be said to form the food of the nation. The soldiers, and they are numerous, are well fed; but many of the peasantry, the serfs and villains, live meagerly enough. Russia, nevertheless, in which cattle are killed as much for the hide and tallow as for the carcase, approaches more nearly in this respect than any European country, to those extensive and thinly peopled regions in South America and Australia, where the herds and flocks are abundant compared to the population.

The distribution of animals for the purposes of food seems to vary with the population; and the number of the former necessarily diminishes as population increases. Thus have we seen, that in the old countries of Europe the herds and flocks are much less numerous, than they must have been, when cities were small and thinly inhabited. In South America at present the herds of cattle are so large and numerous, that the animals are slaughtered for their hide and tallow, the muscular parts being left to beasts and birds of prey. In Australia, also, the sheep used to be kept for the fleece alone; but this is found to be less profitable in certain years than to slaughter them for their tallow, by which large profits are often realized. We have been informed that not very long ago one gentleman realized in a very short time L.3000 from the sale of tallow obtained from sheep sacrificed in this manner.

Thus it appears, that on the habitable globe there are, in the relative proportion of animals and human inhabitants, at least two opposite extremes, which to a certain extent render the reasonings of Mr Smith and all similar speculators inapplicable and unavailing. In certain countries with thin and scanty population, cattle are so numerous and multiply with so much rapidity, that not only are their carcases more than enough to be used for food, but often the animals are deprived of life in great numbers, in order to apply their hides and tallow to the uses and necessities of the human race. In another class of countries, again, in which the human race has been for many ages established, and where population is consequently dense, the number of sheep and oxen is so small compared with the population, that the bodies of these animals acquire a much higher value, and they are not sufficient to supply with food, when used in this way, above one-fourth or one-fifth of the population.

What, then, becomes of the argument either in favour of or against the use of animal food or vegetable food exclusively as the ordinary diet of the human race? It is clear that in a large part of the habitable globe it is impossible to provide animal food for the inhabitants; and on this ground alone it might be prudent and proper to inculcate the use of vegetable food. We fear, nevertheless, that all appeals of this kind will be useless with those who have it in their power to obtain that species of food; and that necessity alone, either the impossibility of obtaining it, or the conviction that its use is hurtful, will be adequate to wean the human race from this long continued habit.

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## ART. V.—*An Inquiry into the Physiological and Medicinal Properties of the Aconitum Napellus; to which are added observations on several other species of Aconitum.* By ALEXANDER FLEMING, M. D., President of the Royal Medical Society of Edinburgh. 8vo. London, 1845. Pp. 160.

THIS treatise on the *Aconitum napellus*, or monkshood, obtained for the author a gold medal from the Senatus Acedamicus of Edinburgh in 1844, and as it makes known the physiological and therapeutic action of that active but hitherto somewhat neglected plant, we shall very shortly glance at its contents.

The inquiry is divided into six sections. 1. History, botany, &c. of monkshood. 2. Physiological action on animals and vegetables. 3. Physiological action on man. 4. Therapeutic action. 5. Mode of administration. 6. Physiological action of other species of aconite.

In the first section, after pointing out the botanical characters of the monkshood, and showing that the *Aconitum napellus* is the only species which possesses active properties, Dr Fleming proceeds to state that the tubers are the most active part of the plant, and most so immediately after the period of flowering, when also they are largest. The leaves are the next most active part of the plant, but they lose their activity the moment the seed begins to form. The flowers follow the leaves in activity; while the fruit and stems contain the least of the peculiar active principle.

Aconite produced in animals weakness and staggering of the limbs, increasing to perfect paralysis, impairment of the sensations, slow and laboured breathing, blindness, spasmodic twitchings, and death by asphyxia. After death the heart was found beating with considerable strength, and the peristaltic movements of the intestines also continued for some time. The muscles were found less irritable than usual, but became rigid as they were wont to do after death. General nervous congestion was remarked extending to the brain, *venæ cavæ*, right side of the heart, &c., but the blood coagulated on being allowed to stand.

From all his experiments on animals the author concludes that the most characteristic symptom of the action of the poison of aconite was the production of muscular paralysis. He could not satisfy himself that it produced an irritant action in any case. On vegetables aconite seemed to act as a direct sedative poison.

Aconite when applied externally to man acted as a direct sedative to the nerves of sensation. When the root was chewed it produced a sensation of heat and tingling in the lips, tongue, and fauces, with sense of constriction in the throat; and when the alkaloid or tincture was applied to the skin it caused the same tingling and hot sensation with a sense of tightness and dragging. The common sensibility of the part to which it was applied was impaired, as well as the special sensations, so that little pain was experienced in the part when pinched, the senses of taste and smell were blunted, and if applied to one temple the sight of the corresponding eye was more or less completely lost.

In enumerating the physiological action of aconite on man the author considers it under four different degrees of operation, the first two of which include the utmost extent to which it is safe to carry it. One dose of five minims of the tincture produced after a while a feeling of warmth, nausea, and oppression of the breathing, attended with numbness, tingling, and sense of distension in the lips and tongue, slight muscular weakness, diminished strength, and firmness of pulse, and slow respiration. A second dose of five minims in a couple of hours, or a single dose of ten minims, caused more intense sensation of tingling, which extended over the arms, fingers, &c., while the sensibility became more impaired, the pulse fell lower in strength and frequency, and the respirations diminished still further in numbers. Great muscular debility was experienced; giddiness and confusion of sight came on whenever the erect posture was assumed. The person sank into a lethargic state, and complained much of chilliness, particularly in the extremities, which were cold to the touch. These phenomena continued in full intensity from three to five hours, when they gradually disappeared.

To this extent alone was it safe to administer the aconite. But the author has composed his treatise in such a manner as to lead to the belief, that he has been several times allowed to carry the administration of the drug to an almost fatal extent, or has seen it carried to the extreme verge of safety in the Royal Infirmary of Edinburgh. If this be really the case, it is not easy to say whether we are more to be surprised at the want of principle, and rashness evinced in devising and performing such experiments, or the want of judgment in giving them publicity. The publication of such statements induced the managers of that institution to make a full investigation of the subject, when we are informed, they found that aconite had never been given so as to produce fatal results, and that only once poisonous symptoms were accidentally developed. We suppose, therefore, that the author has used a poetic licence not very becoming in a scientific treatise, when he describes, as witnessed by himself, the symptoms attending a poisonous and extreme dose, and talks of having seen patients recover from the former of these states. In fact, the knowledge of the result of this inquiry by the managers of the Royal Infirmary of Edinburgh throws doubts over the whole of the statements in the treatise, and is apt to induce the belief that the author describes, as seen by himself, what he never saw, and what never occurred. After such an explanation the profession will be able to judge what amount of credit ought to be attached to the following statement.

"On the administration of a fourth dose of fine minims two hours after the third, the symptoms assume a more alarming character. The countenance becomes pale and sunken; froth issues from the mouth, and the prostration increases. Some thus affected have stated that they felt as if dying from excessive loss of blood. Consciousness usually remains; or there may be slight wandering delirium, as occurs also after profuse hæmorrhage. The voice is whispering or is altogether lost. The pulse becomes still smaller, weaker, and more irregular, and the breathing more imperfect. The surface is colder than before, and is covered with a clammy sweet.

"I have seen patients recover from this state under the administration of proper remedies."—P. 25.

The following description, we must accordingly infer, has been generalized from accounts of fatal terminations given by different authors.

"When the action of the drug is carried to a fatal extent the individual becomes entirely blind, deaf, and speechless. He either retains his consciousness to the last, or is affected with slight delirium; the pupils are dilated; general muscular tremors, or even slight convulsions supervene; the pulse becomes imperceptible both at the wrist and heart, the temperature of the surface sinks still lower than before; and at length, after a few hurried gasps, death by syncope takes place."—P. 25.

We were informed that the physicians of that institution, when examined before the managers, stated that no aconite was given to any patient, so far as they knew, except when ordered by themselves. Dr Fleming, however, appears by his own testimony to have, by some means or other, experimented on patients in that institution in a very reckless manner.

Thus, in endeavouring to ascertain the physiological action of the other species of aconite, the author ventured to administer at once doses which could not fail to have proved fatal, had the species from which the tincture was prepared possessed any activity; and it is to be recollected that until these experiments were made, he had no certain means of knowing whether the species possessed activity or not. Thus tinctures of all the different species were made of the strength of one drachm of the dried root to one ounce and a half of rectified spirit. Fifteen or twenty minims of the tincture of *Aconitum napellus* were found to be a full dose, producing marked physiological effects; yet he ventured to exhibit half an ounce of the tincture of the *A. anthora* to a man, and a whole ounce to the same individual on another occasion! Of the tincture of the *A. lycoctonum* he gave half an ounce to a female; and the same quantity of the tincture of the *A. barbatum*. In this section of the genus, however, one species appears to have been met with possessing greater activity; for we find that ten minims of the tincture of the *A. ochroleucum* to one female, and thirty to another produced a sense of burning heat in the face, hands, and feet, general warmth, and diaphoresis. Had the author told us all the truth here, we should probably find that he ventured to give as large doses of this species as of others in the same division, and we should like to know the results. Of the remaining species in the same section he gave at one dose half an ounce of the tincture. What, then, induced him to limit his dose of that of the *A. ochroleucum* to thirty minims. With regard to the other species he never says he began with small doses and gradually increased them. What then led him to suspect the existence of greater activity in this species, and not at once give the same dose which such a reckless experimenter gave of all the allied species? The tincture of the officinal species of aconite of the London and Dublin Pharmacopœias he administered "even to the extent of half an ounce" without noticing any effects.

The author next considers the several actions of aconite on the cerebro-spinal, muscular, vascular, respiratory, and secerning systems, and on the alimentary canal. From these he concludes, that aconite is a calmative anodyne and antispasmodic, which would prove useful in convulsive and spasmodic diseases; that it is an advisable antiphlogistic in apoplexy, pleuritis, or any disease in which the circulation of the brain is excited, or where there is inordinate activity of the general circulation, as in pneumonia, pleuritis, &c.; that it is contraindicated wherever there exists anæmic states of the system, weakness of the circulation, any impediment to the free flow of blood through the heart or lungs, any difficulty of breathing, and also in advanced stages of bronchitis; and that it does not appear to be a cumulative drug, nor yet an irritant.

The inference that aconite is not a cumulative agent we altogether deny. Its cumulative effects we have several times witnessed; and we think it is there that its powers require to be most sedulously and vigilantly watched. But, if no other evidence of this fact were at hand, the fatal issue of its exhibition in the case of Dr Male of Birmingham were sufficient to show that the drug is cumulative.

In treating of the therapeutic effects of monkshood, the author advances little which was not previously known. He, however, confirms its beneficial action in many of those diseases in which it was employed, and recommended by Drs Curtis, Duncan, Copland, Turnbull, Roots, Sigmond, Thompson, MM. Störck, Hufeland, Busse, Delens, Jobert, Vogel, Lombard, &c. Thus in many varieties of neuralgia, as tic-douloureux, hemicrania, sciatica, as well as in nervous and rheumatic headach, he found it frequently effect a cure. In the successful cases of neuralgia the treatment averaged six days. Four out of six cases of gastralgia were cured by its means. From its action in diminishing the action of the heart, its employment is recommended in certain diseases of that organ, and in aneurism of the large vessels. Aconite has been very largely employed in rheumatism since first recommended by Störck; indeed Lombard and Sigmond regard it as a specific. In the acute cases which came under the author's notice, the duration of the treatment was between five and six days, and out of fifteen cases cardiac affections were observed in only two. This plan of treatment, therefore, seems to be as successful as any yet adopted, and to have less tendency than any other to produce extension to the heart. In chronic rheumatism it is recommended to employ it externally, but should this fail it may also be given internally. The internal administration is more especially indicated where there is any redness or swelling of the part. It seemed to have less effect when there was affection of the smaller joints. In lumbago, erysipelas, carcinoma, pruritus, hysteria, and spasmodic asthma, monkshood has also afforded occasional relief.

Exhaustion by alcohol is the best mode of obtaining the active principles of the drug. Water dissolves but very little of the activity, and the application of much heat to the expressed juice, in forming the extract, destroys much of the aconitina. The author recommends the tincture to be prepared by macerating 16 ounces of the dried and powdered root of aconite in 16 ounces of rectified spirit four days, then to pack into a percolator, and add rectified spirit till 24 ounces were obtained. In this manner is prepared the tincture to which the author refers in his experiments. From this tincture the extract is procured by carefully distilling the spirit, till the residue attains the proper consistence. The dose is from one-sixth to one-third of a grain, thrice daily. The tincture, however, is preferable for internal administration, as being more uniform in strength, and should be given in doses varying from two to five minims, repeating it if necessary in four hours, or giving it in half doses after the same interval if it is merely required to keep up the action of the drug. Sickness may be prevented by conjoining an effervescent draught with the dose of aconite.

It seems to us that the above described tincture is too strong for general use. Almost all the active tinctures of the pharmacopœia are ordered to be prepared of the strength of one drachm of the drug to one ounce of fluid, and this active drug ought to form no exception to the general rule. A tincture of this strength is much more manageable than the one recommended by Dr Fleming, where an additional drop may prove an over-dose; whereas twenty drops of the tincture we recommend, which would be equal to five drops of the author, would form the medium dose, and no risk would be run of producing poisonous symptoms from a single additional drop being accidentally given.

For external application the author prefers the tincture, one or two drachms of which may be rubbed over the affected part daily; or an ointment may be made with aconitina of the strength of two to eight grains to the drachm of lard. The application of these to the abraded skin is dangerous.

In the sixth section Dr Fleming proceeds to point out by a reference to experiment, that, of the four sections into which the genus is divided by Decandolle, the only one which possesses poisonous properties is that of the napellus, of which the *Aconitum napellus*, monkshood, is the best known species; and the *Aconitum ferox*, the Indian species, is supposed to be even more poisonous.

In an appendix is given a selection of experiments performed on man and the lower animals, for the purpose of ascertaining the active properties of the drug; but for these we must refer to the work itself.

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## Art. VI.—*On Diseases of the Liver.* By George Budd, M.D., F.R.S., Professor of Medicine in King's College, London, and Fellow of Caius College, Cambridge. London, 1845. 8vo. Pp. 401.

Dr Budd commences with an account of the minute structure of the liver, as ascertained by the researches of Mr Kiernan and Mr Bowman, and Muller and Henle. As we considered the distribution and arrangement of the vessels when we gave an account of the labours of the first of these authors, we shall notice only those points which have not been previously mentioned.

When a small portion of liver is examined by the microscope, it appears to be a mass of nucleated cells, flattened, irregular in shape, but mostly spheroidal; the largest being about one-thousandth part of an inch in diameter. Each cell contains a *nucleus*, which again contains a *nucleolus*, indicated by a central pellucid spot. These cells contain oil-globules and amorphous granular matter. Their colour and transparency depend much on the colour and quantity of matter contained, which vary much in different cases. They are usually of a light-brown tint, and almost transparent; but occasionally they are yellowish and opaque.

These nucleated cells are the immediate agents of secretion.

Similar nucleated cells exist in the mucous membrane of the gall-bladder and biliary ducts, though differing in form and appearance. But these cells have not been traced beyond the ducts; and the mode in which the nucleated cells of the liver communicate with those of the mucous membrane of the ducts is consequently unknown.

These nucleated cells, it has been said, contain globules of oil or fat, from which it is believed the bile is secreted. These globules are small and few in number in ordinary livers; but in the adipose state of the liver, and in that induced by confining animals to the continued use of fatty substances, they are so large and numerous as to distend the cells to double their natural size, and accordingly to increase much the volume of the gland.

These cells contain also in Cirrhosis the colouring matter of the bile.

After giving the composition of bile from Berzelius, and of choleic acid from Demarçay, Dr Budd observes that it is clear enough that a large proportion of the proper principles of bile are derived from the waste of the body, and are a product of the metamorphosis of the tissues and of materials stored away in the system.

Various observations are made to show that the bile is a carbonaceous or hydro-carbonaceous secretion, and that the liver thus acts as a channel for conveying carbon and hydrogen out of the system. In graminivorous animals, such as the horse and ox, this is unquestionably true; carbon being the chief substance excreted by the liver in these animals.

The quantity secreted in a given time it is manifestly difficult to ascertain. But from the results of accidents, in which the liver and biliary apparatus have been injured, Dr Budd leaves it to be inferred, that about half a pint of bile is secreted in the course of twenty-four hours. The author allows, however, that as this was under peculiar circumstances of great stimulation of the liver, we are not entitled to infer that so large a quantity is secreted in health, and in the ordinary circumstances of healthy action.

The great use of the secretion of bile from the liver the author thinks is to purify the blood, and at the same time to prevent fermentation in the chyme, and in this manner to aid proper digestion and promote the peristaltic action of the intestines.

After this preliminary discourse on the structure of the organ, and the nature and supposed uses of the bile, the author proceeds to the proper subject of his work, the diseases of the liver, which are considered in five successive chapters in the following order; first, congestion of the liver; secondly, inflammatory diseases of the liver; thirdly, diseases resulting from faulty nutrition or faulty secretion of the liver; fourthly, diseases resulting from the presence of heterologous growths; and fifthly, jaundice; to which is attached an appendix on the structure and nature of the liver-fluke.

I. The vascular structure of the liver renders it peculiarly liable to congestion. In the simplest form and in slight degrees, the twigs of the hepatic vein and the capillaries terminating in them are found turgid with blood, while the portal twigs and the capillaries proceeding from them are empty. This state gives a section of the liver a mottled appearance. The central portions of the lobules, where the vessels are congested, form isolated spots, while the marginal vessels are empty. This state is very commonly and most usually the effect of impeded motion of the blood through the heart and lungs, and hence is common in persons destroyed by diseases of these organs.

In a more advanced degree of congestion, more of the vessels forming the capillary net-work are filled in the direction towards the portal vessels. The congestion extends from lobule to lobule at those points where the contiguous lobules are united by their capillaries; and when the congestion has nearly but not quite reached those twigs of the portal vein that define the lobules, all the capillaries of the lobules may be injected, excepting those immediately surrounding the portal twigs. A section of the liver in this state presents the mottled aspect; but the pale portion is in spots where are divided the uninjected twigs of the portal vein; and the red portion forms a continuous band throughout the liver.

A liver congested to this degree is enlarged in consequence of the quantity of blood which it contains; and it may be at the same time in a state of biliary congestion.

In a degree of congestion still greater, the portal vessels are also found injected; and the whole liver is red; but the central portions are of a deeper tint than the marginal portions.

The chief anatomical characters of congestion, therefore, are the deep red colour of the organ, the mottled or marbled aspect, and more or less enlargement, and sometimes lacerability.

One of its most ordinary effects on the surface is to render the colour of the face dingy, and even slightly yellow, and of course more or less that of the whole person. This is also observed to take place during life in those labouring under diseases of the heart, with impeded circulation through its chambers and through the lungs. The occurrence of similar appearances in ague, and after that disease, manifestly depends on the same state of the liver, though in this case it may subside as the aguish condition is cured.

Congestion of the liver and all its effects may take place likewise, in consequence of morbid conditions of the blood itself. Thus, in fatal cases of *purpura hemorrhagica*, the author has seen the same state of the liver and spleen, both being of a deep dark red from excessive congestion.

Congestion, in certain cases, is confined to the portal veins and the capillary vessels proceeding from them. This is rare, and met with chiefly in children.

II. Inflammatory diseases of the liver, Dr Budd distinguishes and arranges in the following manner: 1*st*, suppurative inflammation, or that which leads to suppuration and abscess; 2*d*, gangrenous inflammation; *3d*, adhesive inflammation, or inflammation causing effusion of coagulable lymph; *4th*, inflammation of the veins of the liver; *5th*, inflammation of the gall-bladder and ducts.

1. In considering the history and origin of suppurative inflammation of the liver, the author inquires into the causes of that occurrence; and these he refers to the following heads: *1st*, violence or mechanical injury; *2d*, suppurative inflammation of a vein; *3d*, ulceration of the large intestine, or ulceration of the intestines, the stomach, the gall-bladder, or ducts; and *4th*, according to some authorities, inflammation of the duodenum, spirit drinking, congestion of the liver, excessive equinoctial heat, and the miasma of intermittent or remittent fever.

Of all these causes, little doubt can be entertained that the most common and the most potential are decidedly venous inflammation and ulceration of the intestines, either small or great. External violence is rarely the cause of hepatic abscess. More commonly this produces either laceration with hemorrhage, or it gives rise to inflammation of the peritoneal coat, which is then found to have formed adhesive connection with the diaphragm, with the external surface of the hypochondriac region, or with the stomach, colon, or kidney. Among 60 cases arranged in tabular form from different sources by the author, in one only, a case recorded by Andral, could the disease be traced to a blow. Yet in this case were two abscesses on the convex surface; and in all probability they were collections of matter between the hepatic and hypochondriac peritoneum.

Very different is it with hepatic abscess from venous inflammation, which is a more frequent cause of the occurrence. In 15 cases which fell under the observation of Dr Budd in the Dreadnought hospital ship, only one clearly belongs to this head. In 16 cases collected by Louis and Andral, four may be traced to this source.

Inflammation of any vein may probably be followed by the formation of purulent matter in one or more collections in the liver. But certainly the veins in which inflammation is most generally and frequently followed by this result are the veins of bones, often very minute, and the veins of any of the intestinal viscera, from the stomach to the rectum.

The influence of inflammation of the veins of bones in producing this result appears in different modes. It has long been observed that fractures of the skull and injuries of the head were, when they terminated after some time fatally, accompanied with abscess in the liver. Of this occurrence various explanations were offered. One party said, that there was a sympathy between the brain and the liver; and that, by virtue of this sympathy, the injury done to the brain reacted on the liver, and there produced inflammation and abscess. It was of no use to urge against this hypothesis, that often no appreciable lesion was detected in the brain, and excepting the marks of injury to the cranium, and the abscess in the liver, all was sound. The doctrine was still maintained. As, however, it was not satisfactory to all, another party offered a different explanation; and said that, as these injuries of the head were most commonly received in falls from some height, so the same shock which caused concussion or fracture of the skull might cause concussion of the liver and subsequent inflammation. It is quite possible that this may be the case in a few instances; but that the explanation was unsatisfactory and inadequate appears from the fact, that hepatic abscesses were observed in the case of injuries of the head, in which the individual had sustained no fall and his person had received no shock, except the blow on the head.

It is fortunate for the credit of pathological science, that the true cause of those purulent collections has been ascertained to arise neither from sympathy, nor the inflammation following laceration or concussion of the liver. It has been ascertained by various authentic cases, that in general, if not always, they are preceded by inflammation of a vein or veins; and that in cases of injury or fracture of the skull, the inflammation which follows affecting some of the veins of the bone, is sufficient to give rise to the purulent collection in the liver. Cruveilhier has indeed shown that injuries affecting bones, causing inflammation of the osseous tissue, and involving the veins of that tissue, are very commonly followed by abscess of the liver. The veins so affected may be so minute as to escape notice; and hence the errors and misconceptions that have so long prevailed on this subject. The experience, however, of the three days of July 1830, so fertile in other events, contributed to throw light on this mystery. It was found then, that in some cases injuries and fractures of the cranium, in other instances compound fractures of the bones of the extremities, were followed by purulent collections within the liver; and always almost, was it found that the veins of the fractured and subsequently inflamed bone were inflamed and contained purulent matter.

The veins of bones, indeed, appear to allow of this species of suppuration and subsequent deposit in the liver more easily than the veins of other textures; and to account for this Cruveilhier observes, that the veins of bones being contained within incompressible canals, do not collapse, and that consequently remaining open they are more likely to become inflamed than those of other parts.

We have above expressed ourselves, as if it were only a very frequent, but not a constant or invariable occurrence for the veins to become inflamed, in order to the formation of purulent collections within the liver. This we do, because we doubt whether it be absolutely necessary to the formation of purulent collections in the liver, that a vein or veins themselves should be previously affected with suppurative inflammation. It is no doubt true, that they have been often found inflamed and containing purulent matter and lymph. But it is possible that they may act as mere carriers of purulent matter, and, without being inflamed themselves, they may absorb or imbibe the purulent matter from parts containing it and in which they are soaking. On cases of this nature the present author observes.

"In cases in which we cannot find the inflamed vein, the facts that the abscesses are scattered in the same way, and occupy the very same anatomical seat as in those cases in which the source of the pus is known,—that this kind of dissemination and the anatomical seat occupied are also the same as in the case of injected mercury and secondary cancer, are conclusive in showing that the agent arrives by the blood, and almost conclusive that this agent is a pus globule."

Instances of purulent collections within the liver, in consequence of inflammation of the veins of the intestines, are often observed. Cruveilhier mentions a case in which a man of 60 had a protruded rectum replaced, after repeated and violent attempts, which caused much pain. He speedily became ill with the usual symptoms indicating disease of the veins, and on the fifth day expired. Several small abscesses, superficial and deep-seated, were found in the liver. In other instances the puriform collections appeared after operations on the rectum, where the actual cautery was employed; after the operation for *fistula ani;* and after that for strangulated hernia, in which a portion of irreducible omentum suppurated.

Of the carrying power of the veins we have already spoken. The clearest proof of it is, we think, found in the next head, to which we now come, viz. hepatic abscess after ulceration of the intestinal canal. This indeed appears, and has long appeared to us so clear, that we have been in the habit for several years past of referring, in all instances of conjoined hepatic abscess and intestinal ulceration, the former event to the latter by the operation of the branches of the *vena portarum;* and it appears to us that the author might have safely placed the present head under the last, of which it can be regarded in no other light than as a variety.

Of twenty-nine cases of this conjunction given by Annesley, in twenty-one, or nearly three-fourths, were there ulcers more or less extensive in the large intestine; and in two other cases the colon was contracted with stricture, showing the presence of dysentery at some former period. Among fifteen fatal cases which fell under the observation of Dr Budd in the Dreadnought, in eight cases there were ulcers in the large intestines; in one case two ulcers were observed in the stomach; and in two cases the state of the intestines was not observed; so that in nine among thirteen cases hepatic abscess was conjoined with ulcers in the colon or stomach. Among sixteen cases collected by Andral and Louis, in two cases ulcers are noticed in the large intestine and in the lower end of the ileum; in one case ulcers were noticed in the lower end of the ileum only; in four cases ulcers were noticed in the stomach; and in one case in the gall-bladder. In one of these cases of ulcer in the stomach, the ulcer was caused by the abscess opening into the stomach; and this case, therefore, may be excluded. But even with this deduction, there are among fifteen cases seven, in which there was ulceration of some part of that extensive mucous membrane from which the capillary veins arise and proceed to unite in the *vena portæ*.

The author is at some pains to show, first, that this conjunction is not accidental, but occurs so frequently that the two affections must be considered as standing to each other in the relation of cause and effect; and secondly, that the intestinal ulceration preceded the hepatic abscess, and consequently was its cause. Neither of these positions do we think that it is possible to call in question. To our minds, both, as now stated, have been long familiar; and we have further no doubt, that the only means by which the connection is maintained are the carrying or absorbing powers of the small veins arising from the gastric and intestinal mucous membrane.

It is very true that, in a certain class of cases Dr Budd observes, after Dr Annesley, in India, the symptoms of liver disease appear as soon as those of dysentery or even before them. We do not perceive that this militates strongly against the conclusion above stated. In a climate like India, where so many causes as heat, full living and intemperance, and miasma, act both on the liver and the whole alimentary canal, it cannot at all be regarded as an unexpected circumstance to find the liver early affected, and the colic mucous membrane afterwards diseased; or to find them both suffering at the same time; and how can we determine the exact amount of the pernicious influence which the intestinal mucous membrane, though not ulcerated and simply vascular or congested, and thereby irritated, may exert, through the medium of its extensive venous system, upon the organ to which that venous system eventually conveys blood. In order to explain, however, that class of cases in which hepatic abscess precedes dysentery, Dr Budd is inclined to adopt the Indian idea, that the dysentery is caused by the passage of irritating bile. But were this the case, we should expect the small intestine to be earlier diseased, and more diseased than the large intestine. This, however, we find not to be the case; and, indeed, so frequently is it reversed, that often, nay, most commonly, the ileum is entirely sound, at least along its superior and middle tract; and only a few inches at the lower end with the colon present traces of ulceration. The bile, if it irritates, must irritate most the membrane where it touches first, and before it reaches the colon its irritative properties ought to be diminished and abated, if not extinguished. Yet the effects of this irritation are presented in no degree almost by the small intestine, but in a most remarkable degree by the large intestine. To this difficulty we do not perceive that the author has adverted.

Considering all these facts, we do not see how the irritative properties of the bile can be regarded as a potential cause; and we are compelled to have recourse to the old idea, that telluric miasmata, or the effect of violent and great transitions from heat to cold, and the converse, must be the main causes of dysenteric, that is, colic inflammation and ulceration.

Admitting the inference that dysentery or ulceration of the canal is in certain cases a source of abscess of the liver, Dr Budd regards it as obvious that the liver does not become involved by spreading of the inflammation, but by some contamination of the portal blood; in short, either by purulent matter formed by suppurative inflammation of the smaller intestinal veins; or by matter of this kind resulting from softening of the tunics; or by the fetid, gaseous, and liquid contents of the large intestines in dysentery, which must be absorbed and conveyed immediately to the liver.

Without entirely denying the existence or the influence of the causes now specified, further than in saying that the first is not necessary at all, we are disposed to think that the veins act in this case as mere absorbents or carriers of the purulent matter, which is gradually renewed by them as it is formed from the multiplied ulcers which occupy the intestinal mucous membrane. It is proper to observe, nevertheless, that Dr Budd illustrates his own explanation by the notice of various cases.

Besides the causes here enumerated, Dr Budd takes a view of various morbid states assigned by other authorities, as causes of hepatic abscess. These we have already mentioned; and in the present state of knowledge this seems to be all that can be done.

Dr Budd considers next the changes in the structure of the liver induced by purulent collections; the symptoms to which they give rise, and the estimate of their diagnostic value; and lastly, the treatment required. But for all these we refer to the work itself.

The author concludes by noticing four rare varieties of suppurative inflammation of the liver. The first is that in which the inflammation originates in the areolar tissue in the portal canals, and where the matter, instead of forming a circumscribed abscess, is diffused through the areolar tissue surrounding the portal vein and the accompanying artery and duct. The second form is one in which suppurative inflammation commences in the capsule of the liver or in the peritoneum covering it. In this case the matter may be diffused over the surface of the peritoneum, and cause general and speedily fatal peritonitis. In the third variety, inflammation originates in the portal or hepatic veins. The fourth variety is that in which inflammation occurs in the gall bladder or ducts, without similar disease in the substance of the liver. These two form the subject of a separate chapter. In the fifth and last variety, inflammation takes place in the interior of a hydatid cyst, and in no long time converts it into an abscess, the coats of the cyst becoming, at the same time, thick and opaque; and their interior lined with flocculi of lymph.

2. Gangrenous inflammation of the liver all authors agree in representing to be rare; and Dr Budd agrees with Dr Annesley in thinking that cases described as examples of gangrene were merely instances of change in colour occasioned by decomposition and permeation of the tunics after death. Every one conversant in the inspection of dead bodies is familiar with the dark green appearance of that part of the liver in contact with the colon; and knows that it is mere coloration from staining, while there is no softening or destruction of the hepatic tissue.

The lesion, nevertheless, may take place; first, either by gangrene attacking an abscess of the liver, generally with more or less inflammation of the veins; and secondly, in consequence of gangrene of some part of the surface, for instance, the toes, or the sacrum, and the gangrenous inflammation passing thence, apparently by the veins, either to the liver or the lungs, or to both simultaneously. In the latter case it appears in the form, either of one gangrenous abscess, that is an abscess with inflamed ragged gangrenous walls, or in the shape of several collections, all with softened, ragged, offensive smelling, dark-coloured walls, while the neighbouring veins contain fetid purulent matter.

From this it results that gangrene of the liver, like suppurative inflammation of that organ, is most commonly the effect of gangrenous inflammation in some other part of the body; and Rokitanski of Vienna indeed states that he has several times observed gangrene of the liver in connection with gangrene of the lung; and that he has never found it without gangrene of some other part.

3. By adhesive inflammation, as applied to the liver, is usually

meant inflammation of its serous or peritoneal covering. This the present author extends also to inflammation of the substance of the gland. It may also take place in the capsule of the liver, that is, the capsule of Glisson, which in truth is peritoneum. Adhesive inflammation and its effects are witnessed daily in the dissection of dead bodies, sometimes idiopathically, sometimes in connection with new growths, morbid formations, and similar changes.

To this head also the author refers the morbid change, by Lobstein designated *cirrhosis*, and known to English observers by the somewhat homely appellation of the hob-nailed liver. The reason for referring it to this head is found in his hypothesis of the origin of the disease, which he ascribes to inflammation of the fibrous tissue surrounding the large branches of the portal vein, and about the small twigs that separate the lobules. According to his view, inflammation taking place in this particular tissue, the interlobular cellular, causes the effusion of lymph, which indurates the tissue and renders it tough and firm, so that when the liver is cut into sections, it is observed from thin lines or rather septa between small irregular masses of lobules. At the parts on the surface of the liver corresponding to these lines, the capsule is drawn in, so that the surface has a hob-nailed appearance.

> "The tissue of the liver is paler than natural, from the presence of this white fibrous tissue, and from its containing but a small quantity of blood; and it is often yellowish, from accumulation of bilious matter in the cells. When this is the case, a section has the grayish and yellowish colour of impure bees' wax, and, in consequence, the disease has been called by the French *Cirrhosis.*"
>
> "In other cases again, the quantity of this adventitious fibrous tissue is much greater, and by its contraction, the lobular substance of the liver is drawn into round nodules, which, being of a deep yellow colour, from accumulation of biliary matter, are in strong contrast with the gray fibrous tissue between them."

In other instances the yellow matter is dispersed through the substance of the liver like peas; or the vitellarium of the common fowl. Examination by the microscope shows that this yellow matter is the original lobular substance of the liver, drawn into thin round nodules by the adventitious tissue between them. The adventitious tissue is formed from coagulable lymph; and it operates at once as an impediment to prevent the blood from entering the lobules, and the biliary matter from escaping from them.

This disease tends certainly and invariably to the formation of incurable abdominal dropsy. At first the liver is larger than usual; but afterwards it either returns to its own size, or it becomes smaller, being atrophied apparently by the impediment presented to the blood entering the lobules.

It is one of the most common effects of spirit drinking; but it has been observed to take place independent of that habit. It has also been observed to take place in consequence of residence in a hot or tropical climate.

Along with ascites, it causes general obstruction to the abdominal circulation, distension of the vessels, piles, hæmorrhages from the stomach and bowels, in short, all the effects which might be expected to proceed from obstruction to the motion of the blood through the portal vessels.

In general, after it has continued some time, the complexion becomes sallow, and of a dingy, dirty tint; the features are contracted; the figure and extremities are emaciated; while the abdomen is enlarged.

The author has taken some pains to give a good diagnostic delineation.

All treatment is in general unavailing.

4. Next come inflammation of the veins of the liver, suppurative inflammation of the portal vein, adhesive inflammation of the branches of the portal vein, and inflammation of the branches of the hepatic vein.

Inflammation of the portal vein is rare, as the vessel is deep seated and well protected. The author gives from M. Lambron an instance of the occurrence, in which it was the result of a wound of the superior mesenteric vein by a fish bone which had passed through the pyloric extremity of the stomach and the head of the pancreas. The bone transfixed this vessel from above downwards and from before backwards. The superior mesenteric vein at the point of transfixion was filled up by coagulable lymph, which adhered firmly to its coats. From this point the lymph extended into the orifices of the small veins, proceeding from the upper part of the duodenum to the orifice of the splenic vein, but adhering less firmly the farther from the point of transfixion. The trunk of the portal vein was not closed, but was narrowed by coagulable lymph slightly adhering to its coats, which were a little thickened. The vein contained purulent matter mixed with blood.

In another case communicated by Mr Busk, the inflammation of the portal vein was induced by an abscess bursting into that vessel.

From this and similar cases the author infers, that suppurative inflammation of any of the tributary veins of the *vena portæ* kills less quickly than suppurative inflammation of a vein, which returns its blood directly to the lungs. The purulent matter conveyed by the portal vein being arrested in the liver, forms there collections, which are less likely to be dispersed as in the other case through the different organs.

Adhesive inflammation, that is inflammation with effusion of coagulable lymph, taking place in the branches or trunk of the portal vein, does not kill so readily or swiftly as suppurative inflammation. The lymph effused, indeed, obliterates or narrows the vein; but this the patient may survive. In some instances, where the patient survives for years, it is found after death that the liver is marked by deep linear fissures, corresponding to the obliterated branches of the vein, and caused by the atrophy of those portions of the liver which the obliterated branches supplied. When the obliterated branch is near the surface, the capsule is drawn in or shrunk by the atrophy of the intervening lobular tissue. The lobular substance supplied by other branches remains uninjured. But that to which the obliterated vessels is distributed is atrophied, and the organ is in consequence diminished or contracted.

Of this change we have seen a good example in a person in whom the trunk of the portal vein was filled with lymph and obliterated; and the whole organ was thereby reduced in size, so much that it weighed only about one-fourth of the usual amount; while its shape was greatly altered, being rounded and drawn from the sides to the centre. The person in whom this lesion was observed had obstinate abdominal dropsy on which no remedies made any impression, and for which the operation of paracentesis was twice performed with only temporary relief.

5. Inflammation of the gall-bladder and biliary ducts is considered under the following forms; catarrhal and suppurative inflammation; plastic or croupal inflammation, that is, as it ought to have been denominated, diphtheral inflammation; ulcerative inflammation and its effects; such for instance as agglutination and permanent closure of the ducts; and fatty degeneration of the tunics of the gall-bladder.

Catarrhal inflammation, he thinks, is a cause not uncommon of simple jaundice in persons otherwise healthy. Croupal diphtheral inflammation is rare. Ulcerative inflammation is most probably the effect of a gall-stone or gall-stones sticking in the duct, but is said to occur in intermittent and remittent fevers, as the effect of the acrimonious and irritating qualities of the bile in those diseases.

Closure of the ducts, cystic or hepatic, or common, may also take place either in consequence of inflammation or ulceration followed by adhesion, or one or more gall-stones sticking in either of them. Of these, closure of the common duct produces effects by far the most serious and considerable. These effects are either immediate or remote. The immediate effects, which are observed when the closure takes place suddenly, are great distension and sometimes bursting of one of the ducts. This, however, is not frequent. The remote or ultimate effects are exerted chiefly on the lobular substance, the cells forming which are destroyed; while the capillary vessels ministering to secretion having no longer duty to perform are wasted; and the liver itself shrinks and ceases to perform its functions.

"Destruction of the proper cells of the liver, seems to occasion atrophy of the capillary vessels subservient to their secretion—and the two circumstances, combined, explain the shrinking of the liver, and the absence of any appearance of lobules. The cessation of the process of secretion, and the wasting of the capillary vessels, probably renders the passage of the blood through the liver less free, and thus accounts in some measure for the vomiting of blood which occurred the week before death, and for the serous fluid which was found after death in the cavity of the peritoneum."—P. 188.

Among other points deserving attention on this suspension and indeed total suppression of the function of the gland he observes, that, notwithstanding the retention of bile within the system, the cerebral functions appeared neither disordered nor extinguished.

"But, perhaps, the most striking circumstance of all was, that although for a long time before death the liver must have ceased to separate bile from the blood, there were no symptoms of cerebral poisoning, and the mind remained clear to the last. This circumstance will appear still more remarkable, if we compare this case with other cases in which suppression of bile is attended with delirium, or with stupor and convulsions, soon ending in fatal coma. Dr Alison, in a paper published in the Edinburgh Med. and Surg. Journ. for 1835, has collected many cases of this latter kind, and from a review of them he concludes, that it is jaundice from *suppressed secretion*, and not from obstructed gall-ducts, that is peculiarly, if not exclusively, liable to be followed by delirium, coma, and speedy death. He explains this, by supposing that 'the retention in the blood of matter destined to excretion, is much more generally hurtful to the living body than the *re-absorption* into the blood of matters which have been excreted at their appropriate organs, but not thrown out of the body, in consequence of obstruction at their outlets.' The fact is, I believe, correct, but Dr Alison's explanation is not satisfactory, since, in this case, for a long time before death, there could have been no bile secreted, and yet there was no disorder of the brain.

"The case further shows us, that the secretion of bile by the liver is not immediately necessary to life—that a person may live a considerable time when the liver, as an instrument of secretion, is completely destroyed. This destruction of the secreting element of the liver proves fatal, however, in the end, by impairing nutrition and causing gradual but progressive wasting. The time requisite to wear out life, must depend on the age and previous strength of the patient, his powers of digestion and assimilation, the nature and quantity of the food taken, and the various other circumstances that influence nutrition. It will, of course, be shortened by the injudicious employment of lowering measures. In Mrs

Diprose, the cells of the liver had probably disappeared, and the organ had ceased altogether to secrete bile, many months before death,"—Pp, 189, 190.

III. Among diseases resulting from faulty nutrition or faulty secretion of the liver, are placed softening of the liver; destruction of the hepatic cells; suppressed secretion of bile; and fatal jaundice.

These topics. which are all allied, are illustrated by two cases already published in this Journal by Dr Alison; two from the Guy's Hospital Reports, (vol. i.); one case by Mr Clapp of the Dreadnought; one from the Dublin Journal by Dr W. Griffin; three from Dr Graves; one from Dr Abercrombie; and two from Andral.

2. The adipose degeneration of the liver depends on the presence of uncombined oil or fat deposited in large globules in the hepatic cells. The whole gland is then larger, paler, softer, and more greasy than natural. The substance of the liver is pale and generally throughout of a soft buff colour, interspersed with brown and red. The brown or red points indicate the centres of the lobules, which are unusually large and distinct; while the fawn-coloured portions are the margins.

When the quantity of oil is less, the liver is not so large, nor so pale, or soft, but presents the appearance described as the nutmeg liver.

This disease appears to interfere little with the proper function of the liver; and it is chiefly in consequence of the feeling of fulness and distension, which it causes in the right side and in the epigastric region, that it requires to be considered as morbid. When very large it may be recognised by examination of the hypochondriac region and the abdomen, in the upper part of which it forms a prominent swelling.

3. The anatomical characters of the strumous liver are given from Rokitanski in the following manner.

> "Its anatomical characters are—considerable increase of volume, with striking development in breadth, and accompanying flattening; very considerable gain in weight; a smooth, tight-stretched, peritoneal coat; a doughy consistence, combined with a certain degree of resistance and elasticity; anemia; watery, pale red appearance of the portal blood; greyish-white or greyish-red, (mingled with yellow or brown) colour of the organ; smooth, homogeneous, lardaceous-looking section; scarce any fat on the knife-blade.' The morbid appearances, he adds, depend on infiltration of the liver with 'a compact, greyish, often transparent, albuminous, lardaceous, or lardaceous-gelatinous substance."—P. 247.
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> "It is probable that, in this disease, as in the fatty liver, the substance to which the liver owes its increased size and its other peculiarities, is a product of secretion, which, instead of passing off

in the bile, is retained in the liver. Chemical analysis would probably disclose to us its real nature. The microscope fails to do this, from the substance presenting no definite visible objects.

"Scrofulous enlargement of the liver, like the enlargement from deposit of fat, comes on without pain of the liver, or even tenderness; a circumstance sufficiently accounted for by the gradual and even manner in which the foreign matter accumulates, and from its having no tendency to cause inflammation of the capsule of the liver, or of the veins.

"The passage of the blood through the liver is much more impeded than in the fatty liver—probably from the foreign matter being firmer and less yielding than oil-globules. In the case that has been cited from Abercrombie, there was œdema of the legs, and a considerable quantity of serous fluid in the belly. In my brother's patient, there was great ascites, and when the fluid was drawn off by tapping, it rapidly accumulated again to the former amount. In two cases, seemingly of the same kind, which have fallen under my own care, there was likewise ascites."—Pp. 248-249.

"Scrofulous enlargement of the liver occurs in persons much emaciated and in a state of scrofulous cachexy. It is, of course, associated with the general symptoms attendant on this state, and, by preventing the free passage of the blood through the liver, and an adequate secretion and free flow of bile, and thus still further impairing nutrition, must render them worse."—P. 249.

When the liver is simply enlarged without appreciable change in structure, it is said to be in a state of hypertrophy.

4 and 5. The derangements in the biliary secretion, and the formation and causes and varieties in gall-stones come next. These subjects, especially the last, we had reason to consider at some length in our account of the treatise of Dr Thomson;* and it is, therefore, now unnecessary to resume their consideration.

We have only to say, that the section on gall-stones contains an instructive account of these bodies, and their most common effects.

IV. In the fourth chapter, which contains the account of the heterologous growths most common in the liver, we observe, among other cases, that published by Mr Inman of Liverpool in our sixty-second volume, (p. 138.)

In the second section on hydatids is given a very accurate account of the different varieties of these parasitical animals found on the liver; and their appearance and structure are illustrated by very spirited woodcuts. The account is chiefly remarkable for concentrating what is already known on these subjects from all the best sources.

V. The fifth and last chapter on jaundice presents a good delineation of that disease. The following extracts may be given as concentrating the most important results.

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* Edin. Med. and Surg. Journal, Vol. lvi. p. 500 and 501.

"Jaundice, as already remarked, is rather a symptom of disease than the disease itself, and may arise from various causes which it is very important that we should be acquainted with; because a knowledge of the cause, or of the circumstances under which the disease arose in any particular case, often gives us an insight into its real nature, which we could scarcely obtain from considering the symptoms merely.

"The most obvious cause of jaundice, and which was therefore the earliest assigned;—which was, indeed, at one time assigned almost to the exclusion of all others,—is some obstruction in the gall-ducts, preventing the flow of bile into the intestine. This obstruction may arise in various ways.

"It may be caused by a gall-stone passing out of the gall-bladder, and becoming impacted in the common duct. The jaundice that occurs during the passage of gall-stones is caused in this way. It is generally of short duration, soon going off when the obstructing stone has passed into the intestine. But it now and then happens that a gall-stone becomes permanently fixed in the common duct, or leads to permanent closure of the duct by inflammation, and of course the resulting jaundice is permanent.

"A more frequent cause of jaundice from obstructed gall-ducts, is cancerous disease of the liver, or of the pancreas. In such cases the obstruction is permanent, and the jaundice continues till the death of the patient.

"Jaundice, from closure of the ducts, now and then occurs in that form of adhesive inflammation of the liver brought on by spirit-drinking, which sets in with severe inflammatory symptoms, and which leads to adhesive inflammation of the capsule of the liver, and to the effusion of much lymph in the portal canals. In such cases the jaundice generally goes off when the inflammatory symptoms subside; but sometimes the common duct becomes permanently closed or narrowed, by the contraction of lymph effused on its outer surface, and the jaundice is permanent.

"Jaundice from obstruction of the gall-ducts may also be caused by inflammation originating in the ducts, which, from their small size, must be readily closed by viscid mucus, or by inflammatory swelling of their lining membrane. It is probable that this is a frequent cause of jaundice, but at present we cannot surely distinguish jaundice so produced from jaundice resulting from suppressed secretion.

"Jaundice occasionally arises from constipation, when it is caused probably by the loaded intestine pressing on the common duct, and impeding the flow of bile through it. It soon disappears when the cause is removed.

"Jaundice, brought about perhaps in the same way, occasionally occurs during pregnancy. It goes off after child-birth, and may sometimes be removed before by efficient purgatives.

"Spasm of the gall-ducts has also been assigned as a cause of jaundice, and was at one time advanced to explain all cases of it in which no mechanical impediment to the flow of bile was found after death; just as spasm of the intestines was supposed to be the cause of colic, and spasm of the bronchi the cause of difficulty of breathing, in all cases in which no other ready explanation of these symptoms could be found. Spasm of the gall-ducts is, however, something more than a mere hypothesis. The contractility of the common gall-duct, as well as of the efferent ducts of other glands, has been proved by experiment. Muller states that by irritating mechanically or by galvanism, the *ductus choledochus* of a bird just dead, he has frequently produced a very strong contraction of it, which continued some minutes; after which the duct resumed its previous state. We must then admit the muscularity of the gall-ducts, and the consequent possibility of their being contracted by spasm; but we can hardly suppose the spasm to be lasting enough to cause jaundice. If jaundice be produced by mere spasm of the gall-ducts, it must surely be very slight and transient.

" But, although a mechanical impediment to the flow of bile into the intestine, is sometimes the origin of jaundice, it is much less frequently so than was formerly imagined. In a large proportion, perhaps in the greater number of cases, jaundice results primarily, and solely, from the secretion of bile being suppressed or deficient.

" The secretion of bile may be suppressed, or be rendered inadequate, by various causes; especially by those which lead to disorganization or atrophy of the lobular substance of the liver, by which the bile is secreted."—Pp. 381-383.

" In adhesive inflammation of the liver, brought on by spirit-drinking, when this occurs with severe inflammatory symptoms, there is frequently jaundice; but, as before remarked, the jaundice here seems to result from the gall-ducts being closed by the pressure of the lymph effused in the areolar tissue about them. This form of inflammation seems not to involve, *primarily*, the lobular substance of the liver, but rather the portal veins, and the areolar tissue in the portal canals. In the end, however, by obliterating branches or small twigs of the portal veins, it leads to atrophy of the secreting substance of the liver, and in this way also may cause jaundice. But the jaundice in the advanced stages of hob-nailed or granular liver, unless the hepatic or the common duct be at the same time closed or narrowed, is always very slight,—in most cases, a sallowness, rather than decided jaundice."—P. 383.

" Jaundice occurs, too, and jaundice of the most fatal kind, from a species of softening and disorganization of the lobular substance of the liver, which we have still less reason to consider inflammatory. The circumstances under which this disorganization occurs and the other symptoms that attend it, lead to the inference that it is produced by some poison, either introduced from without or resulting from faulty digestion, which, without exciting inflammation of the liver, or leading to effusions characteristic of this state, destroys at once the vitality of the tissues. It would seem, also, from the instances in which jaundice has occurred in several members of a family, or in several persons living together, in quick succession, some of whom have died rapidly, with disorganization of the liver, while others have completely recovered—that the disease may stop short of disorganization of the liver, perhaps even of any appreciable change of its structure. We have seen, too, that jaundice from arrest of secretion may occur from various contaminations of the blood—as by pus, the poison of serpents, the poison of severe remittent fevers—which perhaps do not at once lead to appreciable change of structure. Jaundice, probably from suppressed secretion, occasionally results also from the taking of opium.

" The jaundice, that sometimes results from powerful depressing emotions, or from mental shock, probably depends, also, on arrest of secretion. In the majority of cases of this kind, the jaundice is attended by no alarming symptoms, and soon passes off; but now and then, it proves rapidly fatal by disorder of the functions of the brain.

" Jaundice occurs in various other circumstances, as the result either of arrest of secretion, or of inflammation and consequent closure of the gall-ducts. I have met with several instances in which it occurred during a course of mercury, given for syphilis; and apparently in effect of the medicine. In none of these cases has it been attended with alarming symptoms."—P. 384.

From the sketch now given our readers may form an idea of the value of the contents of this treatise. It may be justly recommended as presenting a correct and useful view of the present state of knowledge, pathological and therapeutic, on the morbid states of the liver.

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## Art. VII.—*The Nature and Treatment of Gout.* By William Henry Robertson, M.D., Physician to the Buxton Bank Charity. London, 1845. 8vo. Pp. 372.

Though the number of treatises, various in extent and differing in merits, on the subject of gout be very great, yet that circumstance should neither prevent physicians from writing nor readers from studying new works on the subject. The assistance which is daily derived from animal chemistry and pathological chemistry in elucidating the nature of those functions, the disorder of which is most conspicuous in gout, is one great reason which must, for a considerable time, render highly acceptable every new attempt to explain the nature and improve the treatment of gout.

We have within a short space of time witnessed the publication of two new treatises on rheumatic disorders, in which the aid of this collateral science has been very judiciously sought and applied in illustrating some of the mysterious portions of these complaints. The present treatise may be viewed in the light of a similar attempt to invoke the aid of the same agency for the illustration of the nature and producing causes of gout, and rendering its treatment, whether prophylactic or curative, more efficient and more successful.

The author of the present treatise must be well known to the reading portion of the profession by an interesting and judicious performance, published in 1838, on the Buxton waters and their use in the treatment of various diseases; and there is no doubt that his position as physician in that place has brought under his observation those numerous and multiplied forms of gouty disorder, which have enabled him to present the result of his reflections and experience in the present shape.

The work consists of a short introduction and seven chapters, in which are treated successively the following topics; 1. the remote causes and the predisposing cause of gout; 2. the exciting causes of gout; 3. the nature of gout, or its pathological essence; 4. the history of gout, or the account of the different forms in which it appears; 5. the treatment; 6. the management of the gouty habit of body; and 7. and lastly, the consideration of the means of preventing gout.

Our limits do not at present allow us to enter into any detailed examination of the mode in which the author has considered these several subjects. But we have read his treatise with much interest; and we are sure that every one that opens the volume will allow that it is not only replete with information brought down to the latest period, and of a very practical character, but that it is conveyed in an agreeable and interesting manner. It is difficult to specify any one part of the volume as more deserving attention than another; for all are ably done. But we may say that our readers will find in the fifth chapter, on the history of the disease, an instructive delineation of that perplexing and proteiform disorder, which shows that it is drawn from actual observation. The scenes which he describes he has evidently often witnessed.

In the chapter on treatment, his observations on the uses and abuses of different medicines, and their appropriate mode of administration, are valuable, and should be studied with great attention by all who wish to understand the best methods of treating gouty disorders.

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## ART. VIII.—*The Fever of the Eclair, Is it African Fever imported, or Common Ship Fever?*

THE arrival of the Eclair steam-vessel in the Channel, after losing so many of her crew by fever, (sixty-two it was said had died on board,) and with a number of sick and dying persons on board, (twenty-three it was said,) produced naturally a very strong and mournful impression on the minds of the public. A vessel coming up Channel with a yellow flag flying instead of a union jack is always a sight more or less disagreeable; and when it is said or ascertained, that she has come from any region or shore remarkable for its sickly and pestiferous character, the feeling is one partly of panic and horror, and partly of sympathy, but generally with a large proportion of the former feeling. All the frightful ideas associated with yellow fever or plague,—contagion, infection, the inefficiency of medical treatment, rapidity in progress, and large mortality,—are at once awakened in the minds of the beholders, and all to whom the intelligence is communicated. Any good reason for the connection of these several ideas is never thought of or inquired for. When it is said, that a vessel has arrived from a pestilential country, as Africa, the Mediterranean, or the West Indies, it is at once presumed that the disease under which her crew labours must be infectious, contagious, or, as it is popularly called, catching.

If it really be asked, what leads persons, professional and unprofessional, to adopt this opinion, it will be found that in general no good reason can be assigned for it; but there is a sort of silent mental process of deduction, which manifestly connects with contagion and ascribes to that agent as cause, the circumstances of violent symptoms, rapidity in progress, little or no influence of medical treatment, and large mortality; and if the disease appear to have come from a foreign country, this conviction is converted into certainty.

This delusion, for it is nothing else, on the part of superficial and hasty observers, our quarantine boards have laboured most industriously to maintain, to encourage, and to strengthen; and though their efforts in this way have been not only most pernicious to the sufferers, but most detrimental to commerce; though they have actually in all instances rendered the state of the sick much worse, than if they had not interfered at all, and always caused infinite loss to the country, yet they are still permitted to proceed in their foolish and ignorant career; and the greatest outrage to humanity is allowed to take place in the middle of the nineteenth century, because a few obstinate and prejudiced persons shake their heads, and talk about infection and contagion, segregation, and seclusion.

To these causes, and to these alone must be ascribed the delay which took place in doing what was right and necessary in the case of the Eclair; and so long as quarantine boards are organized as at present they are, so long will similar delays and blunders occur.

The fever prevailing on board the Eclair could be only one of two forms of disease, either the genuine African fever, that is the fever which we know from the experience of nearly three-quarters of a century to be a violent, unmanageable endemic peculiar to the African coast,—or the ship fever which occasionally takes place in vessels that have been for some time at sea in a foul condition, or have been or continue in tropical countries.

As to the African coast fever, the history of that distemper is now so well known, that no one but a person ignorant of all the experience of the last half century, could imagine that it was contagious. First made known imperfectly and with some contradiction by Lind, it was fully described by Schotte and Winterbottom; we had large experience of it in the attempt to colonize the island of Bulama, opposite the mouth of the Rio Grande, in the accounts by Captain Beaver; then had we more full evidence of its nature in the expedition of Captain Tuckey up the river Enzaddi; in the accounts of Fernando Po, and in various communications regarding Sierra Leone; and finally in the work of Mr Boyle on that colony and its diseases; in the surveying voyages of Captain Boteler on the east coast of Africa; and in the account of the Niger expedition by Dr MacWilliam and Dr Morris Pritchett. To the medical history of these transactions we have already fully adverted in former volumes.

From the testimony of all these observers it clearly results that the fever of the coast and rivers of Africa is endemic in or proper to that region; that is, that it is the product of the soil acted on by solar heat, and the atmosphere; that the cause of this fever, whatever it may be, does not and cannot act unless where it is produced; that it is of the nature of a poison, which is received into the system by respiration; and though it may in certain circumstances produce its effects immediately, yet most commonly a certain time is required after reception into the system before its general effects appear; and that, nevertheless, this poison and its effects are certainly confined to the individual attacked, and are not communicated to others not exposed to the original poison.

Can the characters now specified as belonging to the African coast fever be applied to the fever of the Eclair? Let us examine the facts and see the conclusions to which they lead.

The Eclair sailed from Devonport in November 1844 with a crew of 146 officers and men for the coast of Africa; on which station she remained till the 23d of July 1845, having lost to that time nine men from the common coast fever.

Four days after sailing from Sierra Leone, one man died with fever and black vomit, the first case of the kind it is said which had taken place. This man after having been three days on shore was brought on board on the 23d (we suppose of July.)

During the voyage from Gambia to Goree, Buena Vista, where she arrived on the 21st of August, eighteen persons were attacked with the same fever and black vomit, and thirteen died.

At Buena Vista the disease continued to spread rapidly among the crew; when after permission obtained from the Portuguese governor, it was determined to land the crew, sick and well, and purify the vessel. A fort was appropriated for the accommodation of the seamen and sick; and the officers obtained lodgings in the town.

Every measure was adopted to purify the ship by washing, whitewashing, fumigating, &c.; all the Kroomen remaining on board, with the exception of six employed in attending the sick. The disease, nevertheless, continued to prevail among the officers and men on shore, thirty-one men having died between the 21st of August and the 13th of September.

Under these circumstances, a consultation was held by three naval surgeons; and, upon their report and recommendation, it was determined that the steam-vessel and crew should proceed to England. The ship's company were accordingly re-embarked; and the vessel sailed on the 13th of September. Captain Escourt, meanwhile, who was taken ill the day before leaving Buena Vista, (12th), died on the 16th. At Buena Vista the assistant-surgeon of the Eclair died; and Mr Maclure, a naval surgeon, passenger of the Growler, and Mr Coffy, assistant-surgeon in the Growler, volunteered their services. Here also seven volunteered their services. Dr Maclure died on the voyage to Madeira; and one of the volunteer seamen was taken ill and recovered.

Upon the arrival of the steam-vessel at Madeira, the authorities, (Portuguese), refused permission to communicate with the shore; as had been previously done by the French at Goree. But at this island, Mr Sidney Bernard, a naval surgeon, volunteered his services, and was received on board with two seamen. On the 21st, the Eclair sailed from Madeira, and arrived at the Motherbank on the evening of the 28th September. Between these dates six persons died; and one, making a seventh, on the 30th of September. During the same time eight new cases occurred.

On the 30th the Superintendent-General of Quarantine with Mr Arnott visited the vessel; and on the 3d of October furnished a report, of which the foregoing is the substance.

The question comes here to be, were the whole of these cases instances of the endemic or African fever? If they were, assuredly the mode of extension is totally different from what has hitherto been observed to take place in this disease. It has never been known to continue after the vessel left the coast. The persons who had thoroughly imbibed the poison would all sooner or later be attacked; but it is observed on the best authority that they do not communicate the disease to others in communication with them; and it is also observed, that, if they remain free from fever for a certain time after exposure, the disease does not appear at all in their persons.

The attack of Mr Bernard, and one or two of those who came on board at Madeira, shows, on the contrary, that the cause of the fever was in the vessel itself. The first cases may be allowed to be the African coast fever. But all those which took place after leaving Buena Vista seem very doubtfully indeed to belong to this head; and certainly those which took place after arriving at Madeira are much more likely to have been examples of ship fever.

The nature of this ship fever is probably not in all instances the same. At one time it was believed to be mere typhus generated on board ship; and this we believe that it very often is. It is possible, nay even probable, that several of the latter cases of the disease of the Eclair may have belonged to this head.

Dr Wilson of the navy has, however, shown with as great certainty as such a subject admits, that in vessels, especially if constructed of recent timber, not duly seasoned and not kept clean, within or near the tropics, a species of fever of a very malignant character is liable to be generated, and to continue to attack the crew so long as they remain in the vessel. Of this fact he has given numberless proofs in his Essays on West Indian Fever. This disease even is not contagious; but whoever sleeps on board such a vessel is liable to be attacked by it; and when many persons are crowded together in the same vessel, inevitably many must be attacked, and many will fall victims to it.

Of the nature of the change which the timber in these vessels in tropical countries undergoes, little is certainly or positively known. It appears, however, to be ascertained that the timber does undergo a peculiar change, something of the nature of decomposition; and that in the course of this process there is formed a poisonous exhalation or vapour, which is the cause of the fever.

Now, here is the state of the question. It is quite certain that the fever of the Eclair was not, as was confidently stated by many, endemic fever. In short, that it was impossible for it to be. It must have, therefore, been ship fever, that is, either the fever produced by the timbers of the vessel, or common typhous fever. If it were the former, the distemper is not infectious or contagious. If it were the latter, it is decidedly so.

But here comes the inconsistency, the folly we may say, and the extreme absurdity of all the proceedings of our quarantine establishment and its officers.

Against a distemper known certainly not to be contagious, namely, endemic fever, all the most strict and rigorous measures of quarantine are adopted, to the great injury of the persons sick, to the damage and detriment of commerce, and at a considerable expense both to the country and individuals.

Against a distemper known to be decidedly contagious, namely, typhous fever, when prevailing, which it constantly does, in the heart of London, no precautions whatever are taken, no restrictions are imposed, no quarantine regulations are enforced. Yet against the same disease, if it prevail on board a vessel sailing up Channel, the most rigid system of quarantine regulations is put in execution.

From the Reports of the Registrar-General for the current year, it appears that in September, October, and November, about from 25 to 30 persons die every week of typhous fever; and the average weekly mortality of that disease for five years is about 30 persons. The mortality by that disease varies from 1 in 7 or 8 to 1 in 15 or 16. Suppose we make it at the rate of 1 in 16, it results that in London there are at all times fully 480 persons ill with typhous fever. This, be it remarked, is a disease decidedly contagious; at all events, though it may arise at times spontaneously during cold wet seasons, yet it is certainly propagated by infection and contagion,—communicated from the sick to the sound. Yet against this disease so constantly prevalent in large towns, and so fatal to the labouring and working classes generally, no precautions are ever taken.

Such are the consistencies of the quarantine establishment. It is scarcely possible for the wildest and most fertile imagination to fancy a greater proof of imbecility and folly.

To pursue, however, the story of the Eclair. That vessel was sent round to Standgate Creek, on Thursday the 2d of October, and was moored in the middle of the Medway. Her sick were meanwhile removed to two 74's in ordinary, the Benbow and Revenge. The Eclair was occupied by the Kroomen and the other survivors. In the meantime there has occurred a circumstance which shows that the cause of the fever, as already stated, was situate in the timbers of the vessel herself. The Kroomen were employed to cleanse out her hold; and several of them were attacked by the fever, though not in a severe form.

In the course of a few days the surgeon, Mr Sidney Bernard, who had been attacked, died of the disease.

The selection of a civil surgeon, however accomplished in his own department, to inspect and report on the state of the Eclair, caused both surprise and some displeasure to the surgeons of the army and navy. The person whom the voice of the navy surgeons would have designated to that duty, would have been Dr Wilson, well known by his Essays on West India Fever, and his Report on the Diseases of the Navy; and if he could not have undertaken the duty, there were surely plenty of navy or army surgeons at Portsmouth, Plymouth, or Chatham who must have seen endemic fever and been familiar with its characters, and to whom certainly it would have been both just and becoming, that the duty of inspecting the Eclair and reporting on her condition should be committed. What, it may be asked, is the use of experience in the public service, if this mode of proceeding be pursued?

# PART III.

## MEDICAL INTELLIGENCE.

### MEDICAL PATHOLOGY AND THERAPEUTICS.

*On the Pathology of Yellow Fever.* By Dr Nott of Mobile. (*American Journal of the Medical Sciences*, April 1845.)—Dr Nott has witnessed five epidemics of yellow fever at Mobile, viz. in 1837-39-42-43 and 44, each, however, presenting some peculiarity of type requiring a modification of treatment. From the careful *post mortem* examination of 16 cases which proved fatal in 1843 and 1844, Dr Nott arrives at different conclusions from M. Louis, whose observations were confined to one epidemic at Gibraltar. M. Louis regarded the peculiar appearance of the liver as the essential morbid lesion which was diagnostic of the disease. Dr Nott, however, found the pale liver, which when torn resembled ginger-bread or new leather, in only 2 cases out of 8 in 1843, and 4 out of 8 in 1844. In the other cases, by far the most numerous, the liver was of a dark blue or chocolate colour, engorged with blood, and not dry. In 2 cases the liver was normal. Dr Nott, however, shows, by a reference to cases, that the dry leathery liver is not even peculiar to yellow fever, as he has seen it in those dying from protracted bilious fever, as well as in one who died suddenly from suspected poisoning. The gall-bladder was always found more or less full of bile, which varied in colour from pale green to olive, and was even in some cases black. Its consistence varied from that of water to that of tar. In 1843 the stomach was healthy in 4 cases out of 8; in 1844 it was healthy in 3 cases out of 8. In all the others the mucous coat was more or less red, thickened, mammillated, and softened. The intestines in every case contained matter resembling the black vomit; in the large intestines it was frequently drier, resembling pickled walnuts pounded. The bladder was always found more or less full; in 3 cases the urine was bloody; in 2 it contained matter resembling the black vomit.

Dr Nott directs especial attention to the state of the blood, and all his observations go to prove that the vitiated and diseased state of this vital fluid is the *fons et origo mali*. In every case the blood was fluid, and by piercing with a trocar the right auricle, even 10 and 12 hours after death, he has succeeded in drawing off to the amount of a pint or more. This blood coagulated loosely at intervals varying from 15 minutes to 36 hours. It was deficient in fibrin.

Dr Nott relates several experiments he made for the purpose of ascertaining the nature of the black vomit. He shows it cannot be a secretion, because it consists of little grumous particles, too large to have been secreted by the capillaries. By examining the black vomit during life, he found it to be invariably acid, so much so as instantly to redden litmus paper; and when the same fluid was taken from the stomach and intestines after death, the filtered clear fluid effervesced with carbonates of alkalis. By mixing the blood of those who had died from yellow fever with this clear fluid, he found it to be instantly converted into the black vomit; and the same was produced whenever blood was mixed with a fluid containing a few drops of muriatic acid. In fact, he found that the resemblance of this last was so great to the black vomit, that if a little flax seed tea were added to represent the mucus of the stomach, the most minute inspection could not detect the one from the other. He hence concludes that the black vomit is nothing else than blood which has escaped from the capillaries of the mucous membranes, coagulated in little particles by the extremely acid secretion of the stomach and intestines.

In endeavouring to show the light which these researches throw on the treatment which ought to be adopted, Dr Nott points out the fact that the diminution of fibrin in the blood, and the passive hæmorrhagies which occur, all tend to prove that yellow fever does not depend on a pyrexial or inflammatory state, but the very reverse; and that the poison, whatever it be, which gives rise to the yellow fever, acts primarily and essentially on the vital fluid, poisoning the very source of life. He would therefore, as a general rule, proscribe the use of the lancet, excepting in those very rare cases in which local inflammatory lesions occur at a subsequent stage.

*Pathology of Tetanus.* By Mr Stafford. (*London Medical Gazette*, 25th April 1845.)—Mr Stafford, from several dissections of patients who have died of tetanus, concludes that "tetanus is a permanent disease on the motor tract of the *medulla oblongata* and spinal chord, brought on by some distinct reflected local irritation." The cases were as follows:

1. A boy of 14 years of age, burnt on the thigh, penis, and scrotum, so severely that the integument sloughed. After some days difficulty of swallowing, with tightness of the muscles of the neck was observed, which increased to trismus and opisthotonos by next day, on the evening of which he died.

The external veins about the neck and back were loaded with blood. The *dura mater* of the spinal chord was of a dark purple hue with red blushes here and there. The arachnoid membrane of the cervical and dorsal regions of the chord was excessively vascular; but the *pia mater* appeared natural, nor was there any serous effusion. The medullary matter of the chord was darker than usual, and exhibited numerous bloody points.

2. A man, 25 years of age, received a compound fracture of the second joint of the ring finger of the left hand, from a squeeze by a door. On the 8th day thereafter, he was seized with tension and rigidity of the muscles of the back and neck, with slight bending backwards. There was also trismus and spasms of the affected muscles. The finger was then amputated, but the trismus and opisthotonos became complete, and he died convulsed on the afternoon of the fifth day from the first manifestation of tetanic action.

The *theca vertebralis* was greatly distended by a greenish fluid; the arachnoid and *pia mater* were reddened throughout, and on the surface of the arachnoid were found patches of lymph. The vessels of the chord itself were enlarged, and the colour of the medullary matter deeper and redder than usual.

3. A man, after lying on his back on the grass during a hot day, complained on the following morning of stiffness of the muscles of the neck and back. These in a few days gradually increased to complete opisthotonos, to which trismus was superadded. Spasms followed, under which he sunk.

The arachnoid membrane of the spinal canal was in some places reddened, in others opaque. A deposition of lymph of a tough consistence and yellow colour covered its whole surface. In the centre of the dorsal region, for about three inches in extent, there was effusion of blood, which was dark coloured and coagulated. The whole canal between the arachnoid and *pia mater* was filled with effused serous fluid tinged with blood.

4. A boy, aged 14, fell from a horse and cut the great toe of his left foot over the first joint. The wound inflamed and suppurated; and seven days thereafter there appeared stiffness of the neck, which next day ended in tetanic contractions of the muscles of the neck and in complete trismus. He had a hydrophobic dread of fluids, and went into convulsions if they persisted in giving them to him, and he died in twenty-four hours from the first appearance of this symptom.

The brain appeared healthy; but the base of the cerebellum, the *tuber annulare*, and *medulla oblongata* were much redder than natural. The medullary matter of the cervical portion of the spinal chord was redder than natural; but the rest was healthy. The arachnoid membrane of the base of the brain and cervical portion of the spinal chord were injected with blood. There existed traces of inflammation of the trachea, larynx, and pharynx.

*Sudden death from Rupture of a portion of the Muscular Fibres of the Heart.* By Dr James Andrews. (*Northern Journal of Medicine*, June 1845.)—A gentleman, about 60 years of age, whose breathing was hurried on making any exertion, and was accompanied by a loud wheezing sound, after three continuous days severe mental and bodily labour, suddenly fell down and expired. He neither seemed to move or breathe from the moment he fell. The body was examined forty-eight hours after death, and the temperature of the internal parts seemed to be higher than natural. The blood in the vessels was quite fluid. The lungs appeared healthy, did not adhere to the pleuræ, and there was no effusion into the cavities of the chest. No fluid was found in the pericardium. The heart was very nearly three times its ordinary size, was soft and flabby, was loaded with fat, and had a patch of lymph on the surface of the right ventricle. The right ventricle was much dilated, and its walls attenuated; the right auricle was also dilated, and near the *tuberculum Loweri* the muscular fibres were found ruptured in three places, from above downwards, to the extent of three-quarters of an inch, with extravasated blood among the ruptured fibres. The external serous covering of the heart, however, remaining unruptured, had prevented the blood from being effused into the pericardium. The left ventricle was softened, dilated, and its walls attenuated in its upper two-thirds. The left ventricle appeared to be healthy. A small cartilaginous body was observed at the base of one of the mitral, and of one of the tricuspid valves which were otherwise healthy. The semilunar valves and coronary arteries appeared normal. Nothing particular was observed in the abdominal viscera, nor in the brain. The calvarium, however, adhered very strongly to the *dura mater*.

*Case in which a portion of the Intestinal Canal was voided by the Rectum.* By Dr Jeaffreson. (*Proceedings of Medical and Chirurgical Society, London Medical Gazette*, 6th June 1845.)—A man, 17 years of age, had feverish symptoms with anxious countenance, constant vomiting of greenish matters, painful tenesmus, but no evacuations. The abdomen was not tender on pressure, but was becoming tympanitic. Strong purgatives and injections were used to relieve the bowels, but without effect. On the 28th of May, two days after being seen, decided symptoms of inflammation of the peritoneum and bowels came on, the belly became tender, especially so in the right hypochondrium, where a distinct hard swelling was perceptible. Leeches and fomentations were used, but no evacuations were procured till the 31st, when copious offensive discharges occurred. The vomiting from this moment ceased. From this date the patient gradually recovered, having, however, the evacuations filled with gelatinous-looking matter, and in one case streaked with blood. On the 8th of June there was discharged from the intestines a piece of intestine, horribly putrid, about three inches in length. On examining this by means of the microscope, it was distinctly proved to be a portion of the intestinal tube, being composed of cellular tissue, blood-vessels, nerves, epithelium, &c.

*Case of Recovery after loss of a portion of the small Intestines.* By Dr BRIGHAM of Utica. (*American Journal of the Medical Sciences*, April 1845.)—Mrs S., 28 years of age, was admitted, in June 1843, into the New York State Lunatic Asylum, having had a previous attack of insania in 1831, during which she had stabbed herself at two different times in the abdomen. During her confinement there, she manifested the same disposition to injure herself, and one day, getting a pair of large scissors, she made two wounds in her abdomen, one about an inch and a half above the umbilicus, the other half an inch below it, and from one of these drew out a portion of the small intestine and cut it off. She was seen immediately thereafter, when Dr Buttolph ascertained that one end of the intestine had escaped into the abdomen. Concluding she must infallibly die from the escape of the contents among the viscera, he returned the other extremity also, stitched up the wounds, and applied a bandage. The portion removed was found to be seventeen inches in length, contained a quantity of purulent matter, and weighed one ounce and one drachm. A portion of the omentum had also been removed, and weighed one ounce and two drachms. During the dressing of the wound the patient vomited, and the disposition to vomit continued for several days, nothing remaining on the stomach. Injections of broth and of laudanum were administered, and she was kept very quiet. In about ten days she asked for food, and wished laxative medicine. No marked tenderness of abdomen or inflammatory symptoms occurred. Thirty-three days after the accident she had a small discharge of hardened fæces from the bowels, and next day a copious one. This gave her great relief, and from that day she began to improve. Her evacuations are now regular, though there is rather a tendency to diarrhœa, for which she requires to take laudanum occasionally.

*Cancerous communication between the Stomach and Colon.* By Dr WATERS. (*Philadelphia Medical Examiner*, April 1845.)—A man, 65 years of age, corpulent, but of temperate habits, was attacked with symptoms of severe dyspepsia in the month of July 1843. These continued till the 10th of January 1844, when he was, in addition, attacked with hæmatemesis and severe colic pains, the blood being both expelled by the mouth and rectum. The hæmorrhage returned at intervals for several weeks, being always attended by more or less colic pain. On one occasion the matter vomited contained puriform matter. By means of appropriate treatment the hæmorrhage was prevented from returning; but the patient fell off in body, his countenance presented the peculiar lemon tint of a person labouring under carcinoma, and he died in a state of marasmus, nineteen months after the first attack of dyspepsia.

The pyloric extremity of the stomach was found in a carcinomatous state for more than two inches around the pylorus, and was in some places more than an inch in thickness. It adhered to the liver and the colon; its whole internal surface was ulcerated at the point of adhesion. Between the pylorus and the colon there existed an aperture about half of an inch in diameter, which allowed the contents of the stomach to pass into the colon. The mesenteric glands were indurated and enlarged, the abdominal viscera healthy, with the exception of the omentum, which was diseased and partially absorbed. The lungs were healthy; the surface of the heart was covered with coagulable lymph.

*Treatment of Internal Bleeding Hæmorrhoids.* By Dr WATSON. (*New York Journal of Medicine*, July 1844.)—In an interesting paper on Hæmorrhoids and *Prolapsus Ani*, Dr Watson states, that for the bleeding internal piles, he has found injections of acetate of lead the most valuable remedy. He recommends to employ this remedy of the strength of one drachm of acetate to eight ounces of rain or distilled water, and to repeat the injection after every alvine dejection, as it is then chiefly that the hæmorrhage occurs. Two ounces of the solution he regards as sufficient for one injection. An occasional blue pill he finds useful, followed by a dose of castor oil, with extract of taraxacum. For obviating the obstinately costive habit which usually attends hæmorrhoids, Dr Watson recommends as the best two to three drachms of the following confection at bed-time: common rosin, well pulverized, one ounce, clarified honey five ounces. Half an ounce of balsam of copaiva renders this confection still more efficacious, but it is then apt to disagree with delicate stomachs. This medicine produces early next morning a soft consistent motion without griping, tenesmus, or any other disagreeable sensation.

*Iodide of Potassium in Hydrocephalus.* By M. WONIGER of Hamburg. (*Oppenheim's Zeitschrift*, No. 2, 1844.)—A boy, two years of age, was seized with the usual symptoms of inflammation of the brain. The ordinary treatment applicable to such a case was applied till the fifth day, when all the symptoms gave indications of the presence of water in the ventricles. M. Woniger then resolved to try the effect of a solution of one drachm of the iodide of potassium in half an ounce of water. Of this he gave forty drops every second hour the first day, and increased the dose to fifty drops every second hour the next day. On the fourth day a distinct remission of the disease was perceived, and the urine became greatly increased in quantity. Within three days after this the boy had so far improved as to be pronounced out of danger.

*Scirrhous stricture of Colon, and communication between the Colon and Stomach.* (*London Medical Gazette*, May 2, 1845.)—A widow, 64 years of age, had for five years suffered from a protrusion at the umbilicus, and for one year previous to admission into Guy's Hospital, her bowels were constipated, and she had occasional abdominal tenderness. The tumour at the umbilicus gradually became hard, painful, and of a purplish or bluish colour. It then suppurated, and discharged unhealthy purulent matter mixed with blood. Shortly after this, tumours were discovered extending from the epigastric to the left hypochondriac regions. Subsequently she vomited feculent matters, and the bowels became confined. The tumour also could be traced to the left lumbar region. After this she almost daily vomited feculent matter mixed more or less with blood; the breathing became oppressed; the legs swelled; and she gradually sunk.

The lungs contained seven or eight round tubercular masses about the size of nuts. The parts around the umbilicus presented a scirrhous hardness, and the liver and adjoining organs adhered to the abdominal parietes. The left side of the arch of the colon was contracted and its coats thickened, and nearly in the mesial line it communicated with the stomach by means of a somewhat sinuous canal, apparently the remains of an abscess. The edges of this aperture were thickened and presented a scirrhous hardness. The liver contained many tubercular masses, as did also the uterus.

## SURGICAL PATHOLOGY AND THERAPEUTICS.

*Case of Ossification and Dislocation of the Crystalline Lens.* By JOHN F. FRANCE. (*Guy's Hospital Reports*, Oct. 1845.)—This was the case of a groom, aged 44, who twenty years before received a blow on the eye, which was followed by inflammation so acute as to destroy vision. Three or four months before admission, a white body became visible in the eye, and gave rise to pretty constant pain. It occupied the bottom of the anterior chamber, and was evidently the altered lens. It was removed by the usual operation of extraction, was hard, resisting compression or puncture with a knife. When dried, it was found to weigh 0.5 grains, of which 0.3 consisted of carbonate and phosphate of lime, and 0.2 of animal matter.

*Cases of Hypertrophy of the Fingers.* By Mr CURLING. (*Proceedings of Royal Medical and Chirurgical Society, London Medical Gazette*, 2d May 1845.)—The subject of the first case was a poor sickly girl of 15 years of age, in whom the fore, middle, and ring fingers of the right hand are of unusual size. The enlargement of the fore and ring fingers was only slight, but the middle finger was so disproportionately developed that it measured five inches and a half in length, and four in circumference. On the left hand the thumb, index, and middle fingers were hypertrophied. The index finger was the largest, and measured five inches and a quarter in length, and four in circumference. The bones, joints, integuments, and nails of all these hypertrophied fingers were equally and proportionably developed. The middle finger of the left hand was bent outwards apparently by the flexor tendon not having been equally developed as the other parts, since it formed a bridle along its outer edge. The girl had little power over these enlarged fingers.

Professor Owen had communicated to Mr Curling a similar case which he observed in a child two years of age. The middle finger of each hand was nearly twice as long and more than twice as thick as the index finger. A few similar cases were also alluded to, showing that this curious affection had been occasionally observed.

*Fish-hook removed from the Œsophagus without an operation.* By Dr ANTONY. (*Philadelphia Medical Examiner*, April 1845)—An old lady was enjoying her usual siesta on a pallet spread on the floor, when her little grandchild, who was playing about the house with a tiny fishing-rod and tackle, dropped the hook within the open mouth of the old lady. The titillation caused her to awake, on which she closed the mouth and swallowed the hook. Gentle efforts were made to extract it, but without success, when Dr Antony was sent for. He cut off the line to within a foot of the mouth, drilled a hole in a rifle bullet, and passing the line through the hole, dropped the bullet down to the hook. In order to keep the hook in contact with the bullet, a reed was procured, its joints punched out, the line passed through it also, when it was passed into the throat, and pressed down against the bullet. In this manner the hook was easily extracted without injury to the œsophagus or fauces.

*Removal of Fibro-cartilaginous Tumour of the Antrum Maxillare without excision of the Malar Bone.* By Dr RICHARD O'SHAUGHNESSY. (*On Diseases of the Jaws*, Calcutta 1844, pp. 160.)—In an interesting pamphlet on Diseases of the Jaws, in which Dr O'Shaughnessy describes several cases of removal of both upper and lower jaws, on account of fibro-cartilaginous or osteo-sarcomatous tumours, one of the most important is the following.

A Hindoo woman applied to be relieved of a tumour of the upper jaw, which appeared to be about the size of a hand ball. As it did not involve the whole upper jaw bone, was scarcely painful, and only produced slight deformity, Dr O'Shaughnessy at first refused to operate, as he felt averse to remove the whole superior maxilla. She returned, however, in a few months, and insisted on its being removed; and as Dr O'Shaughnessy thought he might be able to remove it, and leave the upper jaw, he performed the following operation:

An incision was made from the angle of the mouth upwards and backwards over the tumour for about two inches. The flaps were then dissected back so as to expose the malar bone, when a strong pair of scissors were passed around the base of the tumour. The tumour was then sliced off, and the whole carefully removed from the antrum, to the walls of which it strongly adhered. The wound was dressed in the ordinary way, and in less than a month she left the dispensary cured.

No falling in of the cheek or deformity followed the operation; she has the perfect use of that side of the mouth, and as the teeth are all preserved, she masticates her food freely. She has been many times seen since the date of the operation, and there does not appear to be any symptoms of a relapse. As the floor of the eye and roof of the mouth are both preserved in this operation, Dr O'Shaughnessy thinks it is one, which, if more frequently performed, would save the necessity of having recourse to the more formidable and dangerous operation of excision of the upper jawbone.

*On the best mode of extracting foreign bodies from the Ear.* By Dr Sims. (*American Journal of the Medical Sciences*, April 1845.)—Dr Sims has found the syringe the most useful and safe instrument for the extraction of foreign bodies from the ear. By means of forcibly injecting lukewarm water into the ear, held by an assistant, so that the canal is rendered as straight as possible, he has succeeded in extracting bodies which have resisted all other means. In proof of its superior efficacy to every other mode, he relates three cases, in one in which a glass ear-drop, in another a berry of the *melia azedarach*, and in another in which a cherry-stone were successfully extracted after all other means had failed. The cherry-stone had been in the ear for a period of twenty years.

*Recovery from Gun-shot Wound of the Chest, wadding remaining in the lung for 20 years.* By Mr Houston. (*American Journal of the Medical Sciences*, April 1845.) John M'Muller, when twenty years of age, was shot through the chest by his gun going off accidentally when crossing a hedge. The gun was loaded with ball, a thick linen patch, and tow wadding. The charge entered the left side, below the axilla, between the fifth and sixth ribs, and passed upwards and backwards. The ball was cut out close to the spine along with a piece of bone, supposed at the time to be a portion of the vertebra. There was considerable hemorrhage and expectoration of blood. The man, however, recovered after many months of suffering, married, had a family, and lived to the age of 46. During all this period he suffered from cough of a peculiar character, and once accompanied by hæmoptysis; and the wound from time to time opened and discharged fœtid purulent matter. He had frequent attacks of diarrhœa and colic, had a miserable existence from bad heath, and after recovery from an attack of cholera, finally sunk from mere exhaustion.

The upper portion of the lower lobe of the left lung was in a state of complete hepatization, and was attached to the ribs round all the aperture by which the ball had entered. On cutting through these adhesions, an opening in the lungs was disclosed, communicating externally with the aperture through which the ball had entered, between the fifth and sixth ribs, and running up in the direction of the spinal column. It was found that the ball, in its passage through the chest, had followed the direction of the ribs, running between the fifth and sixth ribs, hollowing them out so as to have cut away about half of each, the other half of the canal of its transit being formed out of the substance of the lungs. The ball had passed out at the head of the ribs, at their junction with the vertebræ, and the piece of bone which had been carried along with it was found to have come from the sixth rib. The lung firmly adhered to this upper portion of the ribs. In this canal hollowed through the lungs was found a smooth firm substance, which, on being soaked in water and rolled out, proved to be a piece of coarse home-made linen cloth, evidently the patch of the ball. It still retained on its edges the marks of the burnt powder, and was in a state of perfect preservation. It is remarked as the curious fact in this case, that a foreign body may remain in the lungs for a period of twenty-five years, without causing death.

*Abscess of the Groin with symptoms of Hernia, Discharge of Lumbrici, &c.* By Mr HOWALL. (*Proceedings of Medical and Chirurgical Society, London Medical Gazette*, 2d May 1845.)—A man, 70 years of age, was attacked with symptoms of strangulated hernia; and on examination a hard tumour, about the size of a hen's egg, was discovered in the right inguinal region, lying over Poupart's ligament, about midway between the internal and external abdominal rings. As no impulse was communicated to the tumour on coughing, it was erroneously concluded that it could not consist of intestine, but must be an enlarged gland. Calomel and opium with castor oil were therefore freely administered, and moved the bowels. Phlegmonous inflammation, however, took place, and when the tumour was punctured about four ounces of purulent matter escaped. A poultice was applied, and on its removal next morning, two lumbrici, each between five and six inches long, were found in it. Feculent matter continued to be discharged from the wound for three weeks. The discharge from the wound gradually diminished, and at last, by means of pressure, the wound healed over.

*Successful case of Lithotomy in a boy three years of age.* By Dr HEYWOOD of Tuscaloosa. (*Philadelphia Medical Examiner*, Jan. 1845.)—A boy, three years of age, showed symptoms of urinary calculus from the age of six months. The pain became at last excessive, and the effort to micturate was attended with so much straining, that the rectum protruded about two inches. The lateral operation was performed and three calculi extracted, the aggregate weight of which was nearly two ounces. They were found on chemical analysis to consist of the uric acid. The boy speedily recovered, and the protrusion of the rectum did not return after the operation.

*New Instrument for the Dilatation of Strictures of the Rectum.* By Dr MUTTER of Philadelphia. (*Medical Examiner*, February 1845.)—In those cases where the stricture is seated high up the gut, and the ordinary rectum bougie causes much pain, Dr Mütter uses a bladder twelve or fifteen inches long, to the mouth of which is attached a stop-cock. The bladder softened and well oiled, is, by means of a blunt probe, or common urethral bougie, introduced into the rectum, and beyond the stricture, when it is inflated with air until the patient complains of pain. It affords equal pressure over all parts of the stricture, and is easily removed by letting off the air by means of the stop-cock.

A similar instrument has long been used in this country for rectifying the position of the uterus when retroverted.

*On the reduction of Dislocation of the large joints by means of the twisted rope and rack-pin.* By Professor GILBERT of Philadelphia. (*American Journal of the Medical Sciences*, April 1845.)—Professor Gilbert has found that the power furnished by ropes twisted by the aid of any rack-pin, furnishes a means of reduction of dislocations of the large joints as efficacious and powerful as the pully itself, and having over it this especial advantage, that it is capable of being used where no assistance can be procured. A surgeon is thus enabled by himself to reduce a dislocation, which, by any other power at present used, the pulley for instance, would require the aid of at least two assistants.

## LEGAL MEDICINE.

*Contributions to Legal Medicine.* By ARISTIDE RODRIGUE, M. D. CASE I.—*Commonwealth* vs. *Jeremiah Wilson Porter ; Indictment for Fornication and Bastardy. January Term,* 1844: *for Cambria County, Pa.* (*American Journal of the Medical Sciences,* No. 20, New Series, October, 1845.)—Defendant pled "not guilty." The ground on which the defence rested was "protracted gestation," the term extending to 317 days, from September 24th to August 7th. The following testimony was produced.

Margaret Shoup, sworn.—I am a single woman; I am 23 years of age. I am the mother of a female child; it was born the 7th of August 1843; Jeremiah Wilson Porter is its father; the child is living. It was begotten on the night of the 24th of September . . . . . he had connection with me more than once, not more than twice that night; it was three or four weeks after the connection that I knew I was pregnant. I had connection with no other man after that—I never had connection with any man before that; I was in bad health; my courses stopped about three weeks after the connection; *they appeared again about* five weeks before the child was born—they did not appear before that; lasted two days—there was not the usual quantity; about this time, five weeks before the birth of the child, I was very sick; had pains which continued for a long time; I had the pains frequently after this up to the birth of the child.

Catherine Shoup, sworn.—My sister was sick from the 19th January 1843, till the birth of her child. Dr Phytian said she had liver complaint, she quit taking medicine the last of June.

Dr Rodrigue, affirmed.—Have been in practice since I graduated, 19 years since; have attended several hundred cases of midwifery; in my own practice the longest period was upwards of 10 months; have frequently met with cases of protracted gestation beyond the ninth month; it is considered no uncommon occurrence. I have met with several cases (a few weeks, two weeks). I take the pains spoken of to be an attempt at labour.

Cases of protracted gestation are met with in young women; can't say whether they are more numerous after the first birth. The ordinary period is from 270 to 280 days; the birth of the child will occur in or about nine calendar months.

No testimony was produced by the defendant except to prove his absence shortly after he had connection with the girl, and that he did not return until after the birth of the child. He was counseled not to compromise with the female, as the extended term would clear him.

No evidence was produced to impeach the character or conduct of the female; but, on the contrary, she invariably bore a good reputation, and it was also proved that under promises of marriage the plaintiff had yielded to the desires of the defendant.

The court charged the jury strongly in favour of the medical testimony concerning protracted gestation, and the jury, after retiring for a short time, brought in a verdict of "guilty" against the defendant.

There was a circumstance which tended strongly to dispose the jury to admit the case of protracted gestation; among their number were two married men, who stated that their wives always went beyond the usual term of nine months, and on one occasion one went beyond ten months.

Among several other cases which have since come to my knowledge, I may mention the following: Elizabeth Marks, a married woman, at the age of about 36 years, went 11 months with one of her children. Her account is, "that she missed her menstrual period in the beginning of November, (had been regular before), quickened* on the 4th of March; took ship to come to America on the 25th of same month; was very sick during the whole passage, which was a very long and boisterous one; and on the Monday before the October court of Cambria county, was delivered of her child, being altogether at least 320 days.

CASE II.—*Commonwealth* vs. *Bernard Flanagan and Patrick Flanagan. In the court of Oyer and Terminer, Cambria county, Penna. October Term,* 1842: *Indictment for Murder.*—Bernard and Patrick Flanagan were arraigned on the 5th of October 1842, upon an indictment for the murder of Elizabeth Holder by strangulation or choking, by striking with a tongs, &c., a charge to which they pled "not guilty."

It appeared in evidence that on the night of the 31st July, cries of murder and screams were heard proceeding from the house of Elizabeth Holder by Mr Rainey, a neighbour; the cries seemed stifled as one strangled or choked; he, and a boy living with him, went down near to the house, and hearing the voices of men in the house and fearing to go in, proceeded to another neighbour's house, Wm. Wherry, and having procured his assistance, returned; shortly after two men were seen to issue from the house; one had neither coat nor hat on, and the other had a coat but no hat on,—one was taller than the other—one said to the other "down the road;" the accent denoted an Irishman. They were followed a short distance, when they turned into the woods; the night, though dark, was sufficiently clear to distinguish objects.

Upon the return of the neighbours, and entering the house, the body of E. H. was found lying partly on the floor and partly on the upper portion of the door, which had been broken off; she was in her night dress, lying on the left side of her face, with one or both arms crossed under her chest; her hair was in disorder and around her face; a wound upon the head and marks of fingers on the throat and mouth; some of her hair in the joints of a heavy pair of tongs lying near her; signs of evacuations from the body about the room and near her. She was quite dead; the house was in the greatest disorder; the bed was pulled to pieces; the drawers and chests broken open, and their contents lay scattered on the floor.

Pursuit was made the next day, and the prisoners seen at different times and places, making their escape separately from the neighbourhood; they were finally taken, Patrick in Centre county, and Bernard in Clarion. Their hats and coats were found the day after the murder near the house.

The following evidence was adduced on the trial.

On the 26th or 27th July the prisoners left Centre county in obedience to the request of the brothers, to withdraw some property from the county, and to stay away until after the court, as there was a warrant out for them for resisting the sheriff in the execution of his office.

On the afternoon of the 30th they made their appearance in the neighbourhood of the Cottage Tavern in Huntingdon county, a few miles above Hollidaysburg, put their horses to pasture and stayed at the tavern all night, and said they were going to Pittsburg to purchase horses; they were next seen at the summit, nine miles from Ebensburg, Patrick being recognized on the trial by Wm. B. K. Johnston, Patrick telling him there they were returning from Ohio; they were recognized as being next at Munster, a small village three miles from E. H.'s house, between Munster and Ebensburg,† there meeting with a man named Evans and drinking together at a tavern; in company with Evans they proceeded on to Wm. Wherry's tavern; passing E. H.'s house, which is only a few hundred yards from Wm. Wherry's; there they again drank, and Wm. Wherry, at the trial, identifies them as the persons who were in his house that evening, and the clothes and hats produced in court, he testifies to as being worn by the prisoners on that day. They leave Wherry's, Evans going home and the prisoners taking the direction of Ebensburg, but not going there. That night the murder was committed.

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* Quickening, apart from other evidence, would not, in my opinion, be positive testimony of a female being four months with child; for I am acquainted with a lady who invariably quickens at two months, going full seven months after with all her children, now five in number.

† Elizabeth Holder resided about one and a half miles east of Ebensburg Cambria county, on the northern turnpike leading from Harrburg to Pittsburg.

Several witnesses testified to admissions made by the prisoners both before and after their arrest, which strongly implicated them in the murder.

An inquest was held the morning after the murder, and a verdict of murder by person or persons unknown. On the same day a post-mortem examination was made by Dr A. Rodrigue, assisted by Dr Wm. Smith. The examination was made by order of two justices of the peace; it was neither so perfect nor minute as we could have wished, the epidemic dysentery was prevailing to a great extent and severity in the neighbourhood, and our time was too limited; besides, a mob of women and friends had assembled outside of the house, determined to oppose us in our examination, which was hastily carried on in a small room filled with persons, whom we had introduced to assist us in repelling any attack.

Dr Rodrigue testifies "on the afternoon of the 1st May, I made a post-mortem examination of the body of Elizabeth Holder. The general appearance of the body was rigidity of all the limbs; no evacuations from the body; (had been washed and laid out); deceased appeared to have been between 50 and 60 years of age, of a robust frame; the fingers were bent towards the palms of the hands; general pallid appearance of the body, except the face, neck, and back; the discoloration on the back was produced by settling of the blood; the face was swelled, livid, and puffed up—bloated; the jaws were tightly closed, with the tongue slightly between the teeth; the eyes protruded and staring; pupils dilated; eyes a little bloodshot; a great deal of discoloration about the face and neck, livid and dark-coloured; marks of two fingers on the left cheek, and a livid dark-coloured tumour on the left side of the neck under the ear, produced by blood accumulating in that part, of recent formation; the lips were swollen, of livid dark colour; blue, as well as the tongue; the inside of the lips and mouth was of the same dark colour; very offensive fetor from the mouth; a little frothy bloody mucus or saliva from the mouth; the neck was swollen and much discoloured from the blood settling in it; an infiltration of blood in the different parts of the skin exhibited an appearance of bruises and different marks of fingers; marks of finger nails or some sharp half rounding instrument immediately on the neck, (apple of the neck,) more on the right and some on the other side of the neck; can't tell how many finger marks; a good many slight bruises and marks I attributed to fingers; on laying back the skin I discovered extravasation produced by pressure or contusion; swelled as well as extravasated; found a good deal of extravasation in the cellular membrane; a thin substance connecting the skin to the muscles and connecting muscles, this being a loose substance, whenever there is a rupture of a blood-vessel the blood finds easy access through this; showed the cause of the swelling; minute injection of all the veins and capillary vessels; firmness and resistance of the parts much increased, much more so than are usually found in dead bodies; are occasioned by contusion; much extravasation of blood in the muscles; muscles darker colour than natural; the windpipe red and injected; blood forced into it; all the veins of the neck were so turgid and full that it interfered very much with our dissection from the profuse bleeding; frequently had to tie them up; no particular marks of external violence on the chest; but upon opening the chest the lungs were found to fill the whole cavity; they were excessively gorged with blood, mucus, and air. The heart appeared distended, filled up with blood; the veins of the heart most extraordinarily so; did not open the heart; it exhibited great firmness or hardness, as if the cavities of the heart were filled with blood; all the veins of the chest very much distended with blood; the head thickly covered with hair; on laying back the scalp we discovered three severe bruises, one over the left parietal bone; one behind the right ear, a little above and behind the right ear, and one over the right eye; this last the most severe; two or three less bruises of minor consequence, did not consider material; on removing the skull cap (the bone), which was rather thin, we found an old adhesion of the dura mater (a parchment-like skin) to the bone. It is the membrane that covers the brain; the vessels of the brain were unusually turgid; very much distended and filled with blood; a small clot of blood found on the right top of the brain, above the contusion, not under it; no extravasation, no effusion in any of the ventricles or cavities of the brain; a slight effusion of serum or light-coloured water on the base of the brain outside of the dura mater. I attributed that to a rupture in opening the brain; might have been a slight effusion before; the colour and quantity would be increased by the rupture. I believe that the evidence of death in this case to be that of strangulation; from the post-mortem examination. I think none of the marks of violence on the head sufficient to produce death. The unusual turgid state of the lungs and their filling the whole cavity of the chest would be produced by the obstruction of the air-passage, arresting the air to the lungs: but in this case I have every reason to believe the obstruction of the air-passage was not complete at first. Some air passing back and forwards, mere occlusion of air would produce this turgid appearance of the lungs and veins; generally speaking, strangulation makes the eyes bloodshot, protruding and staring; makes the face distorted and livid, and the blood running into it; this is produced by pressure on the external veins of the neck; as soon as the blood in the lungs is deprived of air, vitality ceases; the circulation continued some time after the pressure; may find upon examination that no blood is in the veins. In this case, I suppose the windpipe was not completely closed, and the venous circulation went on till death took place; the heart was firm. I had no doubt as to the producing cause of this death or I would have made further dissection. I examined all the organs necessary to satisfy myself. I believe it was strangulation. Relaxation of the sphincters take place, and evacuations take place; the contents of the bowels are generally expelled; generally about the time death takes place the sphincters are relaxed; generally observed it so. Did not examine those organs. I was satisfied from the other appearances, and did not wish to subject the body to any unnecessary exposure and examination. I am a regular graduate as a physician. I have performed post-mortem examinations in cases of violent deaths, but not in cases of strangulation.

*Cross examined.*—Have examined cases of death from injury on the brain and from poisoning; the contents of the stomach and bowels—can't say how many examinations of injury on the brain I have witnessed, but a great many in the country and in Philadelphia. I derive my knowledge from my profession and the practical knowledge of others and myself. I have not before examined a person strangled to death. Have drawn my conclusions from the conclusions of others learned in the profesion; Beck's Medical Jurisprudence is a work of high authority.

Strangulation may produce apoplexy in one way, that is, apoplexy by full turgid appearance of the brain, but not the morbid appearance that generally leads to apoplexy; anything that causes determination of blood to the head may cause apoplexy, if the patient be predisposed to it. I can hardly say an unusual determination of blood to the head would cause apoplexy without predisposing causes; hereditary disposition is one. Inflammation or irritation of a peculiar kind another; relaxation or debility of these vessels when there is an opportunity for predisposing causes at fifty is more usual; age may develope these causes, but age alone is not sufficient; other diseases may be developed at that age, and that would be a safeguard against apoplexy; hemorrhoidal discharges may act as a drain, and the suppression of these discharges may occasion disease in other parts, as a predisposition to consumption. There is a distinction between sanguineous apoplexy and a serous apoplexy; the latter is from a relaxation. In the case of apoplexy I would look for effusion in the ventricles. It is generally so; Beck gives one instance where there was none; but I can't say, that, apoplexy. The examination was in the afternoon; some delay in consequence. In apoplexy always a determination of blood to the brain during life; when the post-mortem examination is deferred for length of time, in some cases, no cause can be discovered for the death; most writers who have made extensive examinations give a few cases as exceptions to the general appearances; the vascular turgescence in the brain may subside in a few hours, but then the whole system puts on the same appearance; you cannot find *any* morbid appearance. It is a peculiar habit of that body. In such cases the examiner will generally make a report that there is no morbid appearances to warrant death, and they are unable to ascertain what caused death; concussion of the brain, spinal marrow may take place and no morbid appearance be observed; most generally so in concussion, but it is generally otherwise in apoplexy. In cases of concussion no morbid appearance; anything that causes suspension of respiration occasions determinations of blood to the brain, provided it be continued long enough and not momentary; turning of the head where there was a disposition to apoplexy may occasion it; but the individual has generally been unwell. previously; suppression of respiration would be the cause of apoplexy. If the circumstances warrant it, I could swear positively to what I see. The vessels of the brain were unusually turgid and filled. Those are not evidences of apoplexy but of congestion. It is one of the evidences of death by suppression of respiration from violence, a small clot of blood on the left hemisphere of the brain, frequently found in apoplexy, but as frequently found in the substance of the brain as on the surface; if it be in the centre of the brain it may produce sudden death; the blood was in a fluid state. Think in apoplexy the blood would be found in a fluid state; am not positive. In hanging, death is produced by strangulation; sometimes by dislocation of the second vertebra, and sometimes by apoplexy; sometimes by laceration of the windpipe. The eyes frequently protruded, staring and bloodshot in death from apoplexy; but the pupils are contracted, not dilated. I judge that strangulation was produced by the fingers; can't tell how the tongs could produce strangulation; if they could obliterate the air-passage it might; if the tongs had been used there would have been marks directly across the throat. I examined the back part of the neck, saw nothing but infiltration of blood; the neck was not dislocated; I cannot say positively they were fingers; but I am not acquainted with any instrument that would have produced similar marks; the marks on the throat were not at all like any marks of the tongs; the marks were deeper than the discoloration, and some marks like a nail or gouge; I came to the conclusion they were made by fingers' marks; the fingers were larger than mine.

The infiltration of the lungs was caused by suppression of respiration; the more we find vessels filled, the longer respiration continued; might be slight respiration and not sufficient to stimulate the brain; death may take place very suddenly by excluding the air from the lungs. To fill the lungs there must be some respiration for a space of time. Think you could not suspend respiration suddenly by one or two hands on account of struggling, &c. There was no more room in the lungs for healthy respiration; will not say that the individual Betsy Holder died from debility but from strangulation. There were no marks of violence on the body; putting the hand on the mouth would not suspend respiration, unless the nose was stopped also. There would not be discoloration on the face without very considerable grasp; no marks on the neck to warrant me in saying an instrument was used; if a gouge was used would occasion abrasion of the skin; the marks were not more than skin deep; an instrument might make such marks if held very carefully and the person remained still. I used the term half-rounding instrument to show the kind of marks, and not to convey the idea of an instrument being used. Eberle's Practice is a good work; not very scientific. It is a work intended for students.

Mental excitement produces apoplexy, but there you have the effusion which rarely subsides. Fear and joy have produced apoplexy, but not frequently. In diseases of the heart it will not present a healthy appearance, and not find it as this was. Thickening of the walls of the heart may produce disease, but not suddenly. Have been in the habit of examining bodies, but did not find disease without the patient exhibiting external evidence of disease.

I derive my opinion in this way, knowing the healthy appearance of the organs, I apply the morbid appearances as given by others and from my own knowledge; I speak from actual observation and from books. I commenced the study of medicine in 1823 or '24. Have practised in the S. Dispensary of Philadelphia; examined a good many cases there; it was generally the rule all persons that died of important diseases were examined. Strangulation may produce death by apoplexy; death may be produced in different ways by strangulation; effusion outside the base of the membranes not evidence of apoplexy. To the best of my knowledge, I believe I caused that effusion in opening the skull cap.

Dr W. A. Smith testified, that he was present at the post-mortem examination of Elizabeth Holder, and assisted Dr Rodrigue in making the same on the 1st of August, about three P. M. Some objections were made to the examination. After giving a similar account to that already detailed of the appearance of the body upon the post-mortem examination, Dr Smith testifies, I formed the conclusion that her death was produced by strangulation; the whole venous system was a good deal gorged with blood; more particularly the lungs; the external marks of violence on the throat, and the marks of fingers induced me to believe death was occasioned by strangulation; the brain did not present those appearances natural in apoplexy, nor did the substance of the brain itself appear to be injected; on the other hand, the brain was rather pale and devoid of arterial blood. I remember that distinctly, in consequence of Dr R. taking the small scalpel and slicing off a part of the brain to ascertain the fact; I feel satisfied that it was not a case of natural apoplexy; but that the distension of the veins of the brain, their turgid condition, could be attributed to nothing more than some mechanical pressure upon the neck preventing the return of blood from the head to the heart. I think on the left side of the neck were evidently the marks of two fingers; and the marks of a finger and thumb on the right side of the neck. Dr R. placed his right hand over the mouth and on the throat, and remarked, that that man must have had a very large hand, and remarked that he had a large hand and his was larger. Cannot recollect any penetration through the skin; I remember that during our examination we were compelled to move the body; the contents came out of the stomach. It is generally laid down by our best authors that in cases of strangulation, there are involuntary discharges from the bladder and bowels a short time previous to death. We did not discover that the blows had effected any fracture of the skull-bone, and in regard to that clot of blood, it was merely a venous effusion, in a fluid state not coagulated; my own opinion was that it was from a direct blow, or it might have been the effect of a counter stroke, *i. e.*, a stroke on the other side of the head. I hardly think any of the marks of violence on the head sufficient to have produced death. I am a regular graduated physician; commenced study in 1828. Have performed or assisted to perform a post-mortem examination in a similar case; thought of the matter of apoplexy before it was mentioned here; think it did occur at the time of the post-mortem examination; subject of apoplexy came up at our examination, because Dr R. made an examination of the ventricles of the brain to see if there was apoplexy; no coagulated blood.

Dr Rodrigue called again.—As far as I remember, the lips were swollen and livid; no part more swollen than another. The wounds on the neck could not have produced death by lesions. The contusions were the evidences of force. In a mixed case of strangulation, we cannot say one organ suffers more than another: but the mere contusions would not have produced death. In this it was the injury produced on the brain, lungs, heart and nervous systems. The principal nerves in the throat are the nerves from the brain to the lungs; the pneumogastric eighth pair or par vagum. If sufficient degree of violence be applied to that nerve, death may be produced; if cut, instant death may be produced, particularly if separated near the lower jaw. They may be affected by mere pressure, and produce death more slowly; it would then act by suffocation, destroying the connection between the brain and lungs. In apoplexy the bowels are usually costive; most generally so. In suffocation alone there is always congestion of the lungs. In suffocation alone no congestion of the brain. There was congestion of the brain in this instance. In mixed cases, we have congestion of the brain and lungs from strangulation; strangulation can produce both apoplexy and suffocation, and that would be what I would call a mixed case.

Looseness of the bowels not a predisposing cause of apoplexy. The suppression of that is a predisposing cause; a looseness of the bowels sometimes takes place in apoplexy; the eighth pair of nerves includes the carotid arteries.

From the marks of violence in this case it would have been unavoidable not to have grasped those nerves; no marks behind.

On the part of the prisoners but little testimony was produced. They account for their conduct in lurking around the country, by the fact, that the volunteers of Centre County had been out, partly with the intention of arresting them, and that on the night when the murder was committed, they were drunk and incapable of committing such an act, and that their clothes had been stolen from them, and they were ashamed to appear in public after losing their clothes; and again it was contended that no one saw them committing any outrage; that Elizabeth Holder died of apoplexy; and further it was contended by their counsel, that supposing the prisoners had killed her in the perpetration of a trespass, and that apoplexy was the accidental result of violence not intended to kill her, it was not wilful, or murder in the first degree.

Judge White, in addressing the jury, after defining murder at common law, &c., said, "It is for the jury to decide the degree of murder by their verdict from the evidence laid before them, and if the homicide took place in the commission or attempt to perpetrate the four offences (the last counts not being insisted upon), it is their duty to return a verdict of murder in first degree, and the same if they find it was wilful, deliberate, and premeditated killing, the result would be the same.

"The indictment is in legal form, and if the means of death proved agree in substance with the charge, it is sufficient; if the offence was by one of the persons, and the other was present, aiding, abetting, and assisting, the first count in the indictment must be sustained.

"The object of the indictment is to inform the prisoners of the offence charged, but the commonwealth is not required to prove the fact precisely as laid; if the kind of death proved agrees with the species charged, it is sufficient. If laid to have been affected by means of one kind of poison, as arsenic, and the proof is corrosive sublimate, it would be sufficient to convict the perpetrator. . . . . . . The first question of fact for your consideration is, was there a murder committed?—If the deceased died a natural death, if her death was owing to natural apoplexy, of course the prisoners are to be acquitted. . . . . After the inquest was held an examination was made by Drs Rodrigue and Smith, and the result has been detailed to you by them.

"There are some questions, which a jury cannot decide from ordinary testimony, and among those in many cases, is the question whether death has resulted from violence or natural causes, and to ascertain the fact, medical men are usually appealed to to declare from their knowledge of the anatomy and pathology of the human frame. It is the business of their lives to acquire the requisite knowledge, and therefore the law places great reliance in such cases to the testimony of medical men, and without it in many cases, the actual cause of death could not be ascertained. There is no evidence in the cause that the deceased had complained of any indisposition for any short time previous to her decease.

"If the death resulted from strangulation the charge would be supported, though it may have produced apoplexy, and that was the immediate cause of death, as upon an indictment for thrusting quantities of moss into the mouth of the deceased, (a child,) whereby it was choked, suffocated, and strangled, and the evidence was, that the child was found with moss crammed into its mouth exceedingly hard, and a surgeon stated that the child did not die immediately from the moss, but that from the effects of the moss in the throat the parts were so much injured as to prevent swallowing and breathing, and that the bruises of the throat closed the passage and caused the death of the child; the conviction was held proper; so a wound, not mortal in itself, from *improper treatment,* turns to a gangrene or a fever; the party who inflicted the wound is guilty of homicide. It was sufficient if the act done by the malefactor was the mediate cause of death, though it may not be the immediate cause. If, from the evidence, you believe that the violence on the throat of Elizabeth Holder occasioned her death, the offence of murder is made out; and the important question arises, was that act of violence committed by the prisoners at the bar? or were they participating in it?

"It is not pretended that any person saw them commit the act, and the charge is therefore supported by circumstantial evidence.

"This is the case on the part of the commonwealth, and from those facts and circumstances the prosecution contends that the murder of E H. is established; that she was killed in the commission of a burglary, and that, therefore, it is murder in the first degree; and on that, even if it was not in the commission of a burglary, yet the means of death prove that the perpetrators committed the murder in such a manner as shows hearts regardless of social duty, and fatally bent on mischief. That the manner of the killing shows it was wilful, deliberate, and premeditated, and therefore independent of the burglary, it was murder in the first degree, under the Act of Assembly, and that all the facts and circumstances in the case point out Patrick and Bernard Flanagan as the perpetrators of the murder to the exclusion of every other hypothesis. . . . . . .

"It has been urged that the individuals concerned in the murder may have entered the house as trespassers, and that, therefore, they cannot be convicted of murder in the first degree, as no express malice has been proved.

"Under our Act of Assembly as stated to you, the law is changed, and except in the cases enumerated, the malice required to constitute murder must be directed against a human being in order to make the slayer guilty of murder in the first degree; if the homicide is proved to have been *wilful,* *deliberate* and *premeditated,* no further proof of malice is required; it is not necessary to show any spite or grudge on the part of the slayer towards the deceased.

"In the present case. If the prisoners put E. H. to death by means of strangulation, the act itself, continued as it must have been for some length of time, would give time for reflection, and would show that the murder was wilful, deliberate, and premeditated, and would constitute murder in the first degree under the act of 1794." . . . . . .

The case was then left to the jury, who, after an absence of two hours and a half, returned a verdict of "guilty of murder in the first degree."

His Honour, Judge White, then proceeded and passed the sentence of the law upon the prisoners, and they were remanded to jail to await the orders of the executive. On the 29th December 1842, the sheriff of Cambria county received their death warrants, and the 3d of March 1843 appointed for the execution of the prisoners. On the 27th February 1843 a respite to 21st April 1843, from the governor was received. On the 5th day of April 1843, the legislature passed a law directing Judge White to entertain a motion for a new trial, and in case of his refusal, directed the president judge of the fourth district to entertain the motion.

Judge White refused, and Judge Woodward, the president judge of the fourth district, declared the Act of Assembly of the 5th April to be unconstitutional, and refused to obey it.

On the 14th of April 1843, the governor further respited them, but naming no particular date. On the 6th of April 1844, a subsequent legislature passed an act authorising one of the judges of the Supreme Court of Pennsylvania to come to Cambria county, and in connection with one or more of the associate judges of the county, to hold a special court of Oyer and Terminer to hear and determine a motion for a new trial.

Chief Justice Gibson, in a communication to the legislature, also declared this law unconstitutional, and suggested the passing of an act requiring *one* of the judges of the Supreme Court of Pennsylvania to hold a special court of Oyer and Terminer in Cambria on some day prior to the 4th day of July 1844. This act was passed.

On the 1st day of July 1844, the motion for a new trial was entertained before Justice M. E. Rodgers, and on the 10th of July Judge Rodgers delivered an able opinion overruling the motion, and directed the record in the case to be remitted back to the court of Oyer and Terminer of Cambria county for execution.

The motion for a new trial was based upon declarations hostile to the prisoners, made by jurors before they were empanneled; declarations of witnesses inconsistent with their testimony on the former trial; excitement and prejudice against the prisoners at the time of the trial; and after-discovered testimony, all of which they failed to prove.

On the 7th of October 1844, about eight in the evening, Jane Flanagan, a sister of the prisoners, obtained the keys of the room in which her brothers were confined, opened the door, and the prisoners deliberately walked out with their irons on; a few hundred yards from the jail, they sat down in an out-lot, filed their irons of, and being joined by a person armed with a gun, made their escape to some friends in the neighbourhood, where they continued concealed until a tardy search, instituted five days after, was over.

The morning following their escape, the sheriff received their death warrant, which fixed their execution on the 8th of November following.

Thus ended a case which, for interference of legislatures, determination by some to shield the murderers, and the unpardonable negligence, to say the least, of officers, has no parallel in this country.

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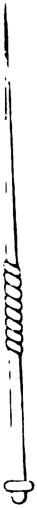

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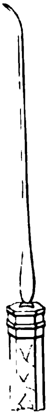

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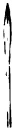

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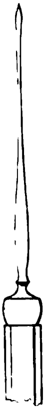

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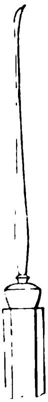

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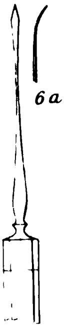

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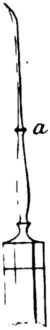

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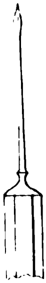

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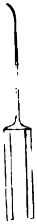

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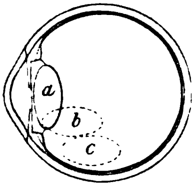

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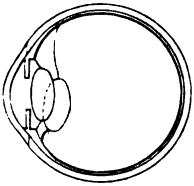

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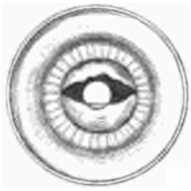

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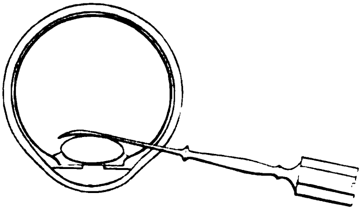

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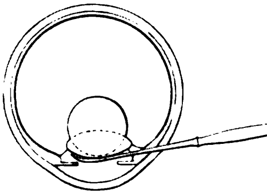

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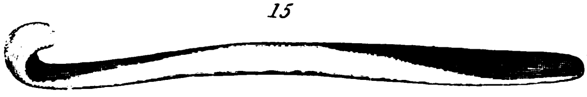

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# PART I.

## ORIGINAL COMMUNICATIONS.

### Art. I.—*On the Perceptive Power of the Spinal Chord, as manifested by cold-blooded animals.* By George Paton, M. D.

Physiologists have divided the movements of the animal economy into voluntary and involuntary. The former order comprises all those movements that are under our power and control; the latter, those that take place without our will, and independent of our agency. But a voluntary movement may be either of a spontaneous character, that is, it may originate in the mind from a particular train of ideas, and independent of any external stimulus operating to suggest it; or it may depend on an impression produced on the surface of the body, exciting the individual to the performance of the action, as when we withdraw a limb from any irritation to which it is exposed. But in both cases there is the utmost freedom in the movement and every element essential to constitute it voluntary. In the one case, the mind is incited to the action by a train of thought connected with sensations and emotions which we had already felt and experienced. In the other, the stimulus, being immediately present to the senses, produces a feeling or emotion which leads to the performance of the action. It thus appears that the principle which constitutes an action voluntary is not the manner in which it is excited, but the mode in which it is performed,—a fact which will enable us more clearly to understand the nature of the movements performed by animals after removal of the cerebrum, and see how far such phenomena indicate sensation and the power of voluntary motion in an animal; or are to be accounted for, as maintained by some physiologists, on the principle of a reflex or excito-motory action of the spinal chord.

As this is a question which involves general principles of great importance in reference to the functions of the nervous system, we shall, in determining the nature of the phenomena observed, endeavour to show, according to the strict and philosophical import of the terms, that not merely sensation but perception enters into the character of the movements,—an indubitable proof that the animal can exercise control over its muscles, or has the power of regulating its movements to the attainment of a definite object.

"Sensation is a name given by philosophers to an act of mind, which may be distinguished from all others by this, that it hath no object distinct from the act itself." It is simply expressive of the pain or pleasure felt by the individual at the moment, but has no reference to the cause or irritation that produces it. When I say that I am suffering pain, I speak of a mere feeling or sensation of the mind, without relation to any external object or source from which the pain originates. And this is all that is to be understood by the term sensation. It is expressive of the state of mind, or manner in which I am affected at the moment, but nothing more,—in which sense, sensation and feeling are of exactly the same import.

But sensation is often employed, in a different sense, to signify the knowledge we have of an external impression by the sense of touch; and this meaning is more frequently attached to the term in accordance with the important discovery, that the spinal nerves consist of a sensory and a motory portion,—the former being employed to convey the impression to the medulla, and the latter to convey it from it, or to the parts to which it is distributed. As when we state that we consider an animal is possessed of sensation from the particular movements which it performs in response to a stimulus. But in strict and philosophical language, this use of the term implies not merely the sensation excited in the mind, but the knowledge and recognition of its cause, or the exercise of perception. Accordingly we find Mr Stewart, in his Elements of Philosophy, drawing the distinction most accurately between these two principles. "If I strike my hand," says he, "against a hard object, I naturally say that I feel pain in my hand. The philosophical truth is, that I perceive the cause of the pain to be applied to that part of my body. The sensation itself I cannot refer in point of place to the hand without considering the mind to be spread over the body by diffusion." And the sentiments of Mr Mill, one of the most recent writers on this subject, are of similar import. "When a stone lies before me I am conscious of certain sensations which I receive from it; but when I say these sensations come to me from an external object which I perceive, the meaning of these words is, that, receiving the sensations, I intuitively believe that an external cause of these sensations exists. Dr Reid also, in his Essays on the Powers of the Human Mind, gives the same definition of the terms. "I shall conclude," says he, "by observing, that, as the confounding our sensations with that perception of external objects which is constantly conjoined with them, has been the occasion of most of the errors and false theories of philosophers with regard to the senses; so the distinguishing these operations seems to me to be the key that leads to the right understanding of both."

"Sensation taken by itself implies neither the conception nor belief of an external object. It supposes a sentient being, and a certain manner in which that being is affected, but it supposes no more. Perception implies an immediate conviction and belief of something external, something different both from the mind that perceives, and from the act of perception. Things so different in their nature ought to be distinguished, but by our constitution they are always united. Every different perception is conjoined with a sensation that is proper to it. The one is the sign, the other the thing signified."

Perception, then, may be defined to be that act of mind which consists in the recognition of an external object, or of an impression produced upon the surface of the body, or the extremities of the nerves by which the various sensations are excited in the mind. And in this sense every source of irritation distinctly recognised becomes an object of perception.

It will thus appear, if we attend to the nature of this operation of the mind so clearly stated by these philosophers, that in every irritation applied to the body there are two things that take place intimately connected, but nevertheless perfectly distinct; *1st*, there is a sensation produced; *2d*, there is a perception of its cause, or recognition of the source from which it proceeds; and it is of the utmost importance to keep this in view in every inquiry of this nature, as it enables us to obtain a precise and definite idea of the nature of the phenomena observed, and to understand the real import and meaning of the terms employed to describe it.

It is also perfectly apparent, according to this definition of the subject, that in judging of the character of the movements of an animal, we must have evidence of perception in the movement before we can determine that the animal is possessed of sensation. For the particular movements of an animal are the signs by which its feelings are manifested to us, just as language is the sign or symbol which expresses the sentiments of man. It is because we observe an animal appear to take cognisance of the stimulus, and endeavour to avoid the irritation to which it is exposed, that we consider it is suffering pain. But in this there is the exercise of perception, or, as it has been termed, design and adaptation in the movement.

And in perfect accordance with these views of philosophers, physiologists recognise a distinct class of muscles, termed the muscles of voluntary motion, engaged in the performance of these movements, and of all those that manifest the will and intention of the animal; as the act of walking, leaping, running, the various and combined movements of the limbs, of the larynx, &c. These muscles are formed capable of a variety of movements, and rendered subservient to the will, evidently for the express purpose of making known our feelings, sentiments, and emotions, and every definite action performed by them must depend on the will and determination of the animal, as there is nothing in the structure of the parts to secure one particular movement in preference to every other. When we, therefore, witness design and adaptation of means to ends in movements performed by this class of muscles, as when an animal, on the application of a stimulus, raises its foot to the part of its body that is irritated, and endeavours to push away the instrument, it clearly indicates perception, or that the animal takes distinct cognisance of the stimulus, and as the movement is specific in its character, the principle on which it depends is not that the impression on the afferent nerve, on being conveyed to the medulla, is merely reflected by the afferent nerve, which constitutes reflex action. But here the impression produced on the afferent nerve gives rise to a distinct act on the part of the animal, by which, through the medium of the motor nerve, its feelings and perceptions are manifested to us. And there may be no immediate connection between the roots of these nerves or that which conveys the impression to the medulla, and that by which the movement is effected, as when an animal, on the integuments of its head being irritated, raises its hind foot to the part to remove the source of irritation.

On the other hand, in the involuntary movements of the body, as the acts of respiration, deglutition, sneezing, coughing, contraction of the iris, &c. there is no evidence of perception nor of any determinating power being exerted on the part of the animal, and consequently no proofs of sensation. For the parts are constructed in adaptation to the particular function which they perform and the action limited to the attainment of that end. Hence the movement always takes place in the same manner, without change or variation, and affords no evidence of design on the part of the animal, or of being subject to our power and control. Still there is evidence of design and adaptation of means to ends in these movements, as appears in every part of the beautiful structure of the animal economy; but it is design inherent in the structure of the part, and not dependent on the will of the animal. For the parts are so framed and constituted as to perform a specific function, by contracting on the application of a particular stimulus, and all that is necessary to excite these acts is, that each appropriate stimulus be applied to the extremities of the nerves, as light to cause contraction of the iris, &c. When we have a series of movements produced that are always performed in the same manner, each successive act being a repetition of that which preceded it. And the principle on which this class of movements depends is that of reflex action,—the impression on the afferent nerve, on being conveyed to the medulla, being immediately and independent of the will reflected by the afferent nerve, when a distinct set of muscles are thrown into action, and a specific function accomplished.

Hence in this class of movements, partaking of an involuntary and reflex character, the design being dependent on the structure of the part, gives no evidence of perception; and so far as these functions are observed in animals subjected to experiment, they could not enable us to determine the existence of sensation. But from what we feel in ourselves it is evident that several of these movements are esentially dependent on sensation, as the acts of sneezing and of coughing, so that it appears that several of the reflex movements of the body are intimately connected with the sensory tract of the spinal chord.

It would thus appear, 1*st*, that it is only in movements that are under the distinct control of the animal, performed by what are termed muscles of voluntary motion, that we can have any evidence of perception, as the involuntary and reflex movements give no indication of it; 2*d*, that the real and essential difference between a voluntary, and an involuntary, and reflex movement consists in the manner in which the motor nerve is excited, and not in the circumstance whether or not sensation may be produced by the stimulus applied to the incident nerve. For whilst we readily admit that many reflex movements take place totally unconnected with sensation, it is equally evident that in some most important movements of the animal economy, in which the action is distinctly reflex, sensation is excited by the irritation of the incident nerve, as in coughing, sneezing, &c. From which it would appear that these particular acts of reflex movement are connected with the sensory columns of the spinal chord.

II. From these preliminary observations, we shall proceed to inquire more particularly into the functions of the spinal chord; and ascertain if the phenomena manifested by animals after removal of the cerebrum or brain afford proofs of sensation and perception; or accord with the theory that the spinal chord is exclusively devoted to the functions of a reflex system of nerves, termed the true spinal system.

And in entering on this part of the inquiry, it will be proper to observe, that in physiology we cannot establish a general principle without the evidence of specific facts. In mathematics and natural philosophy we can arrive, from certain given data, with the greatest precision, at other ulterior truths; but in physiology, which is an inductive science, founded on observation and experiment, we cannot establish a general doctrine without having ascertained particulars. And this principle is the more necessary to be attended to, as it seems not unfrequently to have been lost sight of in researches into the structure and functions of the spinal chord.

We may also observe that, in eliciting the truth on this subject, we must reject every attempt to settle the question by any reasoning *a priori* concerning the nature of mental phenomena, as that a perceptive act must necessarily require the cerebrum for its development. This we need scarcely say is a *petitio principii* of the question, taking for granted the thing required to be proved. We can only determine the functions of the nervous system by the nature of the phenomena observed, for we must proceed in this, as in every inductive science, to found our views on a rigid induction of facts. And if these be clearly established, the doctrine must be admitted, as it rests on incontrovertible data. But if not, it must be considered a mere hypothesis destitute of proof.

How, then, do the facts ascertained, with regard to the functions of the nervous system, or the view at present maintained respecting the structure and functions of the spinal chord, correspond with the principles of inductive science? It is laid down by the supporters of an excito-motory system, that the spinal chord consists of two sets of nerves, one of which is connected with the central or cineritious portion of the chord, and ministers to the reflex movements of the body, termed the true spinal system, because it is considered to terminate in the spinal chord, and to have no connection with the cerebrum; and that there is another set of nerves connected with the cortical or medullary portion of the chord, and terminating in the cerebrum, which organ they consider the centre of this system of nerves, and the cause of all sensation, perception, and volition manifested by an animal. But this theory has not been confirmed by observations on the structure of the spinal chord. It has not been demonstrated that there is one set of nervous fibres connected with the cineritious portion of the chord, on which the reflex movements depend; and that a distinct set of fibres is connected with the medullary portion of the chord, and exclusively devoted to the senso-volitional movements of the body. And unless this be established, the theory cannot be considered as founded on the principles of inductive science.*

But it is principally on physiological grounds that the theory has been supported,—on the movements observed in animals after removal of the cerebrum, or where the influence of the brain has been intercepted from a particular portion of the chord. But we maintain that these phenomena do not establish the theory of the spinal chord being exclusively devoted to an excito-motory system of nerves. For animals, particularly of the cold-blooded class, after removal of the cerebrum, on being irritated, perform movements which afford the clearest proofs of perception, and, if we establish this fact, it will follow that there is a power resident in the spinal chord of taking cognisance of the stimulus, and performing regular and combined movements independent of the cerebrum.

The whole question then resolves itself into this, what is the state into which an animal is reduced, or the movements which it is capable of performing, after removal of the cerebrum? and the subject at present does not relate to the involuntary movements of respiration, sneezing, coughing, &c., of which we have already spoken, and admit to be of a reflex character; but to movements performed by what are termed muscles of voluntary motion, employed in walking, leaping, and the various movements of the limbs, &c., by which alone perception can be indicated.

We proceed then to show, that after removal of the cerebrum or brain, the phenomena manifested by an animal on the application of a stimulus indicate perception, or the power of regulating its movements to the attainment of an end.

*Experiment* I.—In a frog I removed the cerebral lobes with great care, and observed the phenomena.

On removal of the cerebral lobes the frog lost the power of spontaneous motion, as it scarcely moved except when irritated, but remained for weeks seated in a shallow vessel, amidst a little water, with its hind legs drawn up—the posture that frogs are accustomed to assume when they rest; and respiration remained perfect.

But on being irritated, it moved with great vigour, and gave every indication of recognizing the stimulus. When laid upon its back, it immediately turned upon its face, and then made several leaps before it became quiescent. On placing the finger over the spine in the interscapular region, it croaked distinctly. When seized by the foot, it struggled much to be relieved, and on being freed leapt to a distance. On irritating the integuments of its right dorsal region it raised its right hind foot and pushed away the instrument. And on irritating the integuments of its left shoulder, it immediately removed the instrument with its left hind foot. When I touched slightly with the point of a needle the integuments of its abdomen on the left side, it scratched the part with its left hind foot. And when I irritated the integuments of its lumbar region on the right side, it immediately raised up its right hind foot, and pushed away the instrument with force. On being raised up and then replaced upon the table, it would make several leaps before it became quiescent, and then draw up its hind legs, adjust itself, and assume the usual posture of rest; and did not again move till irritated.

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* "The microscope does not confirm the opinion of E. H. Weber, Bellingeri, and Grainger, that some fibres pass straightway to the central substance of the chord." —Mr Paget's Report, Brit. and Foreign Med. Rev. Messrs Todd and Bowman also admit that the most recent observations on the structure of the spinal chord do not coincide with the views of Mr Grainger.—Messrs Todd and Bowman's Physiology, p. 331.

Reflex movements could be produced in the extremities of this frog by compressing gently one of its toes, or irritating slightly with the point of a needle the integuments of its thorax. But the irritation always required to be performed with the greatest caution, and after the frog had remained quiescent for some time.

*Experiment* II.—In another frog I divided the *medulla oblongata* at the origin of the *trigemini* or fifth pair of nerves, and removed every portion of the encephalon anterior to this, and observed the phenomena. The effects of the operation had extended to the origin of the *par vagum*, as respiration continued for a little, but gradually ceased. The frog, however, survived the operation for several days, but no longer exhibited the power of spontaneous motion, as it did not move from the place where it was seated, till irritated; but on being irritated it gave the most indubitable proof of responding to the stimulus.

I compressed gently with the forceps one of the toes of its right hind foot, and it immediately withdrew it with great vigour, turning its body in the opposite direction. I irritated the integuments of its right shoulder, and it immediately scratched the part with its right hind foot. I then seized the part with the forceps and compressed it gently, when it raised up its right hind foot and pushed away the instrument. I touched slightly with the point of a needle the integuments of its left cervical region, and it quickly turned up its left fore foot to the part, and then moved forwards its left hind foot, and scratched the part with it. I touched its cloaca with the point of a needle, and it crawled forwards a little. I surrounded it with objects to prevent its progressive motion, and then irritated its right dorsal region, when it immediately pushed away the instrument with its right hind foot.

I placed this frog upon its back, and irritated slightly with the point of a needle the integuments of its thorax in a longitudinal direction, and a reflex movement was observed in both its anterior extremities. I compressed gently one of the toes of its left hind foot, and a reflex movement was observed in the toes of that and the opposite extremity, and then the frog made an effort to raise itself up.

*Experiment* III.—In another frog I divided the *medulla oblongata* about the origin of the *par vagum*, and removed every portion of the brain, and observed the phenomena. Respiration ceased immediately.

On seizing with the forceps one of the toes of its right fore foot, it raised up its shoulder and endeavoured to withdraw its foot, but being retained it moved forward its right hind foot and planted it against the instrument, at the same time turning its body in the opposite direction, still endeavoured to extricate its foot. On irritating slightly its right dorsal region with the point of a needle, it raised its right hind foot, and pushed away the instrument. When I irritated the integuments of its abdomen on the left side, it immediately removed the instrument with its left hind foot, and then raised its foot and scratched the part with it. When I touched with the point of a needle the right lumbar region it drew up the joint of its right hind leg over the part. When I pressed the left hind foot against the table with my finger, it struggled much to be relieved, and on being freed crawled to a considerable distance before it became quiescent. I then irritated its cloaca slightly with the point of a needle, and it drew up its hind legs over the part.

I placed this frog upon its back, and compressed gently with the forceps one of the toes of it right fore foot, and a slight reflex movement was observed in both its anterior extremities. I compressed gently one of the toes of its left hind foot, and a slight reflex movement was observed in all the toes of that extremity. On compressing the part more forcibly the limb was retracted, and a slight reflex movement was observed in the opposite extremity.

*Experiment* IV. — In a frog I divided the *medulla oblongata*, removing every portion of the brain. The division was made about the origin of the *par vagum* or eighth pair of nerves, which in the frog is the last pair of cerebral nerves. Respiration ceased immediately. After allowing the frog to remain at rest for a short time, I applied irritation, and observed the following phenomena.

On touching with the point of a needle the integuments over the left scapula, it raised its left hind foot, and pushed away the instrument. When I irritated the integuments of the right cervical region, it raised its right fore foot and scratched the part with it When I irritated the integuments over the lower portion of the right scapula, it moved forwards its right hind foot and pushed away the instrument. On irritating the dorsal region the frog crawled forwards a little. On seizing with the forceps a toe of the right fore foot, it distinctly withdrew it. On the part being again seized and retained, it turned its body in the opposite direction, and endeavoured to withdraw its foot, and on being freed placed it below its thorax.

Reflex movements could be produced in this, as in other frogs, by a slight irritation of the extremities, and were always readily excited by irritating the integuments of its thorax when the frog was placed upon its back.

I performed the same experiment on many other frogs, and always with similar results; the animal after division of the *medulla oblongata* and complete removal of the brain, recognising most distinctly a stimulus applied to its body by raising up its foot and pushing away the instrument, or scratching the part that was irritated.*

From these experiments it appears that cold-blooded animals, after being deprived of the cerebrum or entire portion of the brain, can perform distinct perceptive movements, or evince cognisance of the stimulus applied to their body. And there must be sensation and distinct control over the muscles in these specific acts. For we maintain that no difference can be observed between these perceptive movements and those performed by unmutilated animals when subjected to similar irritation. The animal leaps, indeed, or performs regular progressive motion on the application of a stimulus—raises its limb, and removes with its foot the instrument that touches its body, or scratches the part that is irritated. In fine, it comports itself in every respect according to the degree and mode of irritation; and to deny that these movements are under the control of the animal, is to assert that it has no power over the voluntary muscles of its body when we witness in the movement the most distinct evidence of design. It is no doubt true that the animal ceases to exhibit the power of spontaneous motion, as its movements are performed chiefly in response to a stimulus. But then they are perfectly identical with the movements of an animal possessed of distinct voluntary power, and must consequently be performed by the same nerves, as no involuntary movement or principle of reflex action could produce such an effect.

Hence it appears that the function of the spinal chord in cold-blooded animals is not confined to the involuntary or reflex movements of respiration, deglutition, &c. But that we are to attribute to it an inherent power over the voluntary muscles of the body, in regulating and directing them to the attainment of a definite object, or performing distinct perceptive movements on the application of a stimulus.

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* I may state, for the benefit of those who wish to verify these experiments, that they always succeed best early in spring, when the animal is taken, or has just emerged from its winter recess. In which case its physiological condition of a cold-blooded animal is particularly developed.

And this doctrine, it will be observed, leads to a view of the function of the cerebrum opposed to that of M. Flourens, Dr Marshall Hall and others, who consider that it is the seat of all the intellectual and perceptive powers of an animal.* But as we have indubitable proof that an animal may feel, perceive, and move in response to a stimulus, independently of the existence of the cerebrum, it appears that the functions of that organ is not to bestow these powers upon an animal, but to enable it to act on the possession of them, to remember its sensations and impressions, and render the knowledge thus acquired available to the purposes of life.†

*2d.* It will be observed, that, whilst we maintain the doctrine of the perceptive power of the spinal chord, we do not deny the principle of reflex action, though we consider that it may be connected with sensation, as all that it is necessary to produce a reflex movement, is that the motor nerve be excited by the impression on the afferent nerve being communicated to it independent of the will of the animal; and this is the principle on which are constituted the involuntary or reflex movements of sneezing, coughing, &c. But we also admit that reflex movements may be excited in the voluntary muscles of an animal by any sudden and unexpected impression acting on the surface of the body or extremities of the nerves, as when a limb starts up involuntarily by being suddenly pricked with a pin, in which case the impression on the afferent nerve is immediately communicated to the motor nerve and excites the movement of the part. And we have seen that in a frog, after removal of the cerebrum or brain, reflex movements may be readily excited in the body and extremities of the animal by a slight irritation of the integuments or compression of a toe, &c. But these movements are always general and indefinite, and totally distinct from the perceptive movements performed by the same class of muscles.

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* It will be observed that, whilst M. Flourens holds the theory of the excitability of the spinal chord, and Dr Marshall Hall that of reflex action, they both agree in considering the cerebrum as necessary to an animal being possessed of sensation, and the power of perceiving an impression.

† The great difficulty with the opponents of this doctrine, that an animal is possessed of perception after removal of the cerebrum, is, that it shows no evidence of spontaneous motion and remembering the impression. But the absence of the one power is no proof against the positive existence of the other, when it is demonstrated by experiment. It surely does not follow that an infant is incapable of suffering pain, because its mental powers are still undeveloped? or that a person labouring under concussion of the brain does not feel an external impression, when he raises his hand to the part of his body that is irritated? or that the somnambulist does not walk or recognise an object? because they have no recollection of the act? The fact is, that the power of remembering an impression, so as to render it a subject of action, is totally distinct from the power of perceiving it. And whilst the former may be obscured or completely annihilated in an animal, the latter may remain and be distinctly manifested. A patient whom we visited, labouring under an affection of the head, with evident symptoms of pressure on the brain, lay for weeks in a state of deep stupor, insensible to every thing around her, and giving no indication of her wants except by a small movement of the lips, which her attendants observed when she required food or to be raised up. But on pinching her skin, she moaned or raised her hand to the part. It happened that during her illness she required the application of leeches to her side, when her hands required to be held, to prevent her from removing them by force. And yet after her recovery, for she completely recovered, and is now in the enjoyment of good health, she declared that she remembered nothing of all that had transpired. But it would be difficult to suppose that she neither felt pain nor perceived the external impression.

From what has been already stated, it will be seen, that it is illogical to argue, as some physiologists have done, that as there is evidence of design and adaptation in the involuntary movements of the body, when the action is reflex, so the perceptive movements performed by an animal after removal of the cerebrum, may also be dependent on the same cause. For such a supposition, as we have already shown, is subversive of the data by which we determine the character of all perceptive movements. And we have only farther to add, that, as it may be laid down as a general proposition, that reflex action is of a general and indefinite nature, it could never effect a specific movement without a particular structure of the parts. When, therefore, it is maintained by the abettors of an excito-motory system that a decapitated animal is reduced to a mere automatic state, totally incapable of sensation, and yet that movements perfectly indicative of design may be performed by the muscles of voluntary motion, on irritation being applied to the integuments, does it not appear that this amounts to nothing less than a contradiction in terms, or what mathematicians would call *reductio ad absurdum*?

The doctrines then which we deduce from these experiments are the following:—

*1st.* That the cerebrum is the seat of spontaneous motion, of memory, and reflection.

*2d.* That the power of perceiving impressions, and performing movements in response to them, by a distinct control over the muscles of voluntary motion, is a property of the spinal cord, and possessed by an animal after removal of the cerebrum or brain.

*3d.* That the involuntary movements of respiration, deglutition, sneezing, coughing, defecation, &c., are dependent on a principle of reflex action possessed by the spinal cord.

*4th.* That the nerves connected with the muscles of voluntary motion may also take on reflex action, when an impression is produced suddenly on the surface of the body or extremities of an animal; but these movements are destitute of design, and easily distinguished from the perceptive movements performed by the same class of muscles.

In the experiments from which these doctrines have been deduced, it will be observed that every portion of the brain or encephalon anterior to the division of the *medulla oblongata* was removed, and that the division was often made so low as to affect the origin of the *par vagum*, which in the frog is the last pair of cerebral nerves; and yet the animal on being irritated gave the most distinct proofs of perceiving the impression and performing movements in accordance with it: and this we conceive is sufficient to set aside, so far as cold-blooded animals are concerned, the theory of senso-motory nerves being entirely connected with the cerebrum; or the proposition that in a decapitated animal no movements can be excited but those of reflex action.

We now proceed to consider the phenomena manifested by experiments on the salamander; and to show, that, on a still lower division of the chord, the animal possesses control over the movements of its lower extremities, and takes distinct cognisance of a stimulus.

In a salamander, (*Lacerta aquatica*, Linn.) I divided the spinal chord at the third spinal vertebra, and observed the phenomena. This division of the chord leaves the animal perfect power over its anterior extremities, as in the salamander the nerves going to the fore legs arise principally, as in the frog, from the second pair of spinal nerves.

After the effects of the operation had subsided, the animal raised itself upon its fore legs and began to move forwards, but did not drag its body like an animal that had suffered paralysis in its posterior extremities, but made distinct efforts with its hind feet in performing locomotion, supporting itself on them, as on its anterior extremities, and moving them alternately in accordance with the movements of its fore legs, as it crawled slowly along the surface of the table. And during these movements the divided ends of the chord did not come into contact, but remained distinct and separate.

I placed the animal upon its side, and it quickly turned upon its face, and its left hind leg remaining beneath its body, it distinctly withdrew it and began to move forwards, manifesting perfect power and control over its posterior extremities, but the movements were performed with less vigour than before the division of the chord.

When the animal after being quiescent again began to walk, spontaneous motion did not commence in its posterior extremities, but the animal raising itself on its fore legs began to move forwards, and then instead of dragging its hind feet, lifted them by turns, spreading out its toes as it supported itself on them, and moved slowly along the table.

After the animal remained at rest, I touched slightly, with the point of a needle, the integuments of the right dorsal region a little below the division of the chord, and it moved forwards its right hind foot and passed its toes distinctly across the part. I touched in a similar manner the integuments of the left dorsal region, and it quickly raised up its left hind leg, and scratched the part with its foot. On irritating the integuments on the right side of its abdomen, it raised its right hind foot to the part. On touching with the point of a needle a toe of its left hind foot, as it lay extended from its body, it raised its limb, and placed it along the side of the abdomen.

*Experiment* II.—In a salamander, I made a similar division of the chord, viz. at the third spinal vertebra, leaving the animal complete power over the movements of its fore legs, and then removed a small portion of the dorsal vertebræ and lower division of the chord, so that the divided ends could not come into contact.

Shortly after the operation the animal raised itself upon its fore-legs, and began to walk, and moving slowly along the table did not drag its hind feet, but lifted up the one foot and moved it forwards, whilst it retained the other on the table, and so on in regular succession, in unison with the movements of its forelegs, as it performed locomotion. When placed upon its side, it turned upon its face, and withdrawing its right hind leg from beneath its body, again commenced to walk, and crawling over a scalpel which lay upon the table exerted its hind legs most distinctly in passing over the instrument; and during these movements the divided ends of the chord did not come into contact.

Whilst the animal lay quiescent, with its right hind leg stretched along the side of its tail, I touched gently with the point of a needle, the lateral portion of its right dorsal region, a little below the division of the chord, and it immediately moved forward its right hind leg to the part. I touched it again, and it quickly raised its foot, curving its body still more than before, and passed its toes distinctly over the part. I irritated, in a similar manner, the lateral region of the opposite side of the body, and it raised up its left hind foot, and passed its toes most distinctly over the part. After a few minutes, I renewed the irritation, and it again raised up its foot, and passed its toes in a similar manner over the part. On touching with the point of a needle a toe of either of its hind feet, it raised the foot, and changed its position. During these movements its fore legs remained apparently quiescent.

*Experiment* III.—In a salamander, I made a similar division of the chord, viz. at the third spinal vertebra, leaving the animal perfect power over its forearms, and then removed a small portion from the lower division of the chord so that the divided ends could not come into apposition, but remained separate, and observed all the phenomena manifested in the preceding experiments, both as regards the act of locomotion, and the various movements performed in response to a stimulus.

I then passed an instrument into the anterior portion of the spinal chord as far as the occiput, destroying completely that portion of the chord, and consequently all the movements of the anterior extremities.

And on touching with the point of a needle, the integuments of the left dorsal region immediately below the division of the chord, the animal quickly raised up its left hind foot, and scratched the part twice. I irritated in a similar manner, the integuments of the right dorsal region and the animal scratched the part with its right hind foot. On irritating the integuments on the right side of the abdomen, it raised up its right hind foot to the part. I again touched with the point of a needle the left dorsal region, and the animal raised up its left hind foot, and spread its toes over the part. On irritating the integuments of the head, lower jaw, &c., no movements could be produced in the lower extremities; showing that there was no nervous communication between the divided portions of the chord. But as soon as I touched the portion of the integuments supplied with nerves from below the division of the chord, the animal raised up it hind foot, and passed it over the part that was irritated. In short, it seemed to recognise most distinctly a stimulus applied below the division of the chord, but did not move without being irritated.

*Experiment* IV.—In a salamander, I divided the spinal cord immediately below the nerves going to the fore-arms, allowing the animal to retain perfect power over its anterior extremities, and then removed a small portion of the lower division of the chord, rendering the part perfectly separate.

This animal, like the other salamanders, continued to possess the power of locomotion, manifesting control over the movements of its posterior extremities, as it crawled slowly along the table. On irritating the integuments below the division of the chord, it raised its hind leg, and scratched the part with its foot, and performed all the movements which we have described as manifested on a similar division of the chord.*

I now divided the spinal chord immediately behind the skull, laid open the intermediate vertebræ, and removed that portion of the chord, viz., connected with the movements of its fore legs.

I then touched with the point of a needle the integuments of the right dorsal region immediately below the division of the chord, and the animal raised its right hind leg, and scratched the part with its foot, I irritated a similar portion of the left dorsal region, and the animal scratched the part with its left hind foot, and repeated the movement. On irritating the side of its abdomen with the point of a needle, it quickly raised its left hind foot to the part, and on touching the right side of its abdomen, in a similar manner, it immediately raised its right hind foot, and passed its toes most distinctly over the part. When I irritated the integuments of either foot slightly with the point of a needle, it quickly raised it up and changed its position.

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* Most of these experiments were performed in spring, when the animal had just left its winter quarters; and from the physiological condition of the animal, the experiments always succeed best at that period of the year. And many of them were witnessed by competent judges, who can attest the accuracy of the operation and phenomena observed.

During this period no movements could be excited in the lower extremities by irritating the integuments of the head, lower jaw, &c., showing that there was no communication between the divided portions of the chord. But on touching with the point of a needle the integuments of either side of the body immediately below the division of the chord, the animal quickly raised up its hind foot, and scratched the part with it in the manner described—thus recognising most distinctly a stimulus applied below the division of the chord.

*Experiment* V.—In a salamander, I made a similar division of the chord, viz. at the third spinal vertebra, and observed the phenomena which we have described as manifested by the other salamanders—the animal retaining power over its posterior extremities, so as to assist in the act of locomotion; and recognising most distinctly a stimulus applied below the division of the chord, as it raised its hind foot, and scratched the part of its body that was irritated, &c.

A few days after this, I divided the spine immediately behind the skull, and removed the portion of chord contained in the intermediate vertebræ, and also passed an instrument into the cranium, and completely removed the encephalon.

I now irritated with the point of a needle the integuments of the right dorsal region immediately below the division of the chord, and the animal raised its right hind leg, and scratched the part distinctly with its foot. I irritated in a similar manner the integuments of the left dorsal region, and it scratched the part with its left hind foot. I touched with a needle the integuments of the right side of its abdomen, and it raised its right hind foot to the part. On irritating the toe of either of its hind feet, it quickly raised its foot, and placed it in a different position. I irritated the integuments of the left dorsal region, and it raised its left hind foot and spread its toes over the part. But it did not move without being irritated.

I performed the same experiment on many other salamanders, and with similar results, the animal, after the encephalon, and upper portion of the chord had been removed, recognising the stimulus applied to the integuments supplied with nerves from below the division of the chord. But in these cases, an interval often required to elapse before the irritation was renewed, in order that the movements might be distinctly manifested.

1st. These experiments, it will be observed, exhibit very remarkable phenomena. But still, as far as regards the function of the spinal chord, these phenomena are of exactly the same nature as witnessed by experiments on the frog, the only difference being that, in the former case, the chord was divided anterior to the origin of the *par vagum*, and the whole of the brain removed; but in this the chord was divided a little lower in the spine, viz. below the second pair of spinal nerves, and all communication intercepted from the cerebral lobes, or they were entirely removed, so that, as far as relates to the functions of the spinal chord, after it is cut off from all influence and communication with the brain, the movements are essentially the same in character.

2d. The phenomena manifested by these experiments cannot, we maintain, be accounted for on the principle of reflex action. For the elements of a controlling power or agency which enters into these movements renders them incapable of being explained by the impression on the afferent nerve, being merely reflected by the efferent or motor nerve of the part. And in all the examples of reflex action that have been witnessed in man, or described as occurring in warm-blooded animals after division or injury of the spinal chord, the movements have been of a general and indefinite character; the muscles of the inferior extremities merely contracting on the application of a stimulus, so as to produce extension and then retraction of the limb, but nothing like a definite power being manifested. In a case of reflex action which came under our own observation, and to which we particularly attended, the patient labouring under Pott's disease of the last dorsal vertebra, with complete loss of sensation and power of voluntary motion in his inferior extremities. On irritating slightly the toes of either foot, that or even both limbs were immediately retracted and drawn up towards the abdomen, and maintained a vibratory motion for some time, which was always renewed on applying the irritation. But no appearance of control was manifested in these movements, as in the acts of locomotion performed by the salamander. And if the one class of movements be admitted to be of a reflex character, then the other must be considered to be specifically different, as elements of a controlling agency are manifested. Even M. Flourens, who holds the theory of the excitability of the spinal chord, acknowledges that the salamander has the power of moving its inferior extremities and performing acts of locomotion, after the division of the chord; a phenomena which is not observed in warm-blooded animals.

*3d.* We maintain that these phenomena afford distinct evidence of the perceptive power of the spinal chord. The animal, we have shown, does not merely retain the power of moving its limbs, but of moving them with order and regularity, and to the attainment of a specific end, taking distinct cognisance of the stimulus applied below the division of the chord, by raising up its hind leg, and scratching with its foot the part of its body that is irritated. And these movements it performs not merely after the chord has been divided, but after the upper portion has been removed as far as the occiput, so that no influence could be communicated from the brain to that segment of the chord,—nay, after the encephalon has been destroyed. And if these movements be not of a perceptive character, then there is no meaning in language, and we must give a new definition to the term perception. For it is of no avail to urge against these facts, the frequently repeated objection, that many movements of adaptation depend on reflex action, and that these may be of an analogous nature. As well may it be asserted, that the perceptive movements performed by an animal before division of the chord are of a reflex character, as that these belong to that category.

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[*] “Si, sur un animal a sang chaud, sur un oiseau, sur un mammifère, par exemple, on divise un point quelconque de la moelle épinière par une section transversale, aussitôt toutes les parties situées au-dessous du point divisé sont frappées de paralysie. Si, par exemple, la section a été faite au-dessus du renflement posterieur de la moelle épiniére, aussitot les jambes de derrière sont frappees de paralysie; l'animal les traine, mais il ne les meut plus.

“Il n'en est pas ainsi pour les salamandres. L'animal continue a mouvoir ses jambes et sa queue, quoique la moelle épinière, et meme toute la colonne vertebrale, soient coupees fort au dessus de l'origine des nerves des jambes et de la queue.

“Je coupai la colonne vertebrale, et la moelle épinière, sur une salamandre.

“Immediatement apres l'operation, l'animal remuait deja ses pattes de derriere, et sa queue.

“Un mois plus tard, il les remuait, ou les mouvait beaucoup mieux encore. Il marchait, et faisait avancer tour a tour, pour marcher, chaque jambe de derriere, comme il faisait avancer tour a tour celles de devant.

“Cependant le reunion des deux bouts de moelle épinière divises n'avait point en lieu.

“J'ai repete cette experience sur plusieurs autres salamandres.

“Elles ont toutes survecu pendant plusieurs mois.

“Et, de plus, elles remuaient toutes de meme, et surtout quelques mois apres l'operation, leurs jambes de dérriere, et leur queue.”—Recherches Experimentales sur les Proprietes et les Functions du Systeme Nerveux, dans les Animaux Vertebres. Par P. Flourens, p. 420.

M. Flourens evidently perceives that these phenomena are opposed to the view which he maintains in the first part of his work, and to which we have previously referred. And he endeavours to account for these movements on the principle of reproduction of parts, and the relation which the division of the chord bears to the origin of the eighth pair of nerves. But none of these principles can ever account for that *positive power* which the animal possesses, of not merely moving its limbs, but, as we have shown, of taking cognisance of a stimulus, after division of the chord below the second pair of spinal nerves.

*4th*. But perhaps it may be stated, as a metaphysical objection, that it seems opposed to the unity of mind, for a perceptive power to be manifested by the spinal chord, when it is cut off from all influence and communication with the brain. But no metaphysical theory can ever set aside a positive fact, which we maintain is established by these experiments. We must interpret the laws of nature according to the phenomena observed; and if it can be shown on the principles of inductive science—by clear and distinct experiment—that an animal is capable of recognising a stimulus by the power possessed by the spinal chord, when it is cut off from all communication with the brain, then, to overturn this opinion, it will be necessary to disprove the fact, and this we maintain is impossible.

*Darlington.*

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## ART. II.—*Case of Femoral Aneurism and application of a Ligature to the external iliac artery.* By WILLIAM MONRO, M. D., Surgeon to the Dundee Royal Infirmary.

JOHN DOWNIE, aged 56, stone mason, was admitted into the Dundee Royal Infirmary, under my care, on the 14th January 1845, with a pulsating tumour about the size of a turkey's egg, situated at the top of left thigh, immediately below Poupart's ligament. On admission he stated, that, about three months previous, when lifting a heavy stone, he had strained himself in the situation of the tumour; that this, however, gave him very little trouble until about six weeks after, when the uneasiness having increased, he was led to examine the part, and found the present tumour, about the size of a walnut; not apprehending anything serious, however, he continued at his work until within a fortnight from his admission, when the pain and swelling had so much increased, that he was forced to desist and consult a surgeon, who, on detecting the nature of the disease, recommended him to the Infirmary.

On examining the tumour, I found it to be as large as a turkey's egg, somewhat flattened, and situated at the top of left thigh, exactly over the common femoral artery, and immediately below Poupart's ligament, pulsating strongly over its whole extent, and synchronous with the pulse at the wrist. By continued pressure it could be considerably diminished, but on the pressure being removed it immediately regained its former size and appearance. Pressure on the external iliac artery, above Poupart's ligament, stopt its pulsation and diminished its size; distinct bruit could not be heard; heart's action normal; pulse natural; general health good. Patient is of a spare habit, but muscular; has been temperate in his habits for several years past; states that about ten years ago, while working at his trade in London, he had a slight attack of paralysis of his left side, which has left an observable relaxation of the muscles of the same side of face; has no headach; bowels rather confined; tongue clean.

15th. Was ordered an ounce of castor-oil; to have spoon diet; and to be confined very much to bed.

17th. Was bled to ten ounces from arm; blood not buffy.

19th. To take ten minims of tincture of foxglove thrice a-day.

24th. Tumour increasing in size; omit the digitalis.

28th. At a consultation held this day it was agreed to secure the external iliac artery by ligature.

31st. I performed the operation this forenoon in presence of the medical staff of the hospital and other members of the profession. The patient was placed on his back on a table, the shoulders well raised, and the thigh of the affected side drawn up to relax the abdominal muscles. I commenced my incision about half an inch above the middle of Poupart's ligament, extending it, upwards and a little outwards, about three and a half inches, to within an inch of the spine of the ilium, dividing the skin and cellular tissue. The aponeurosis of the external oblique was then brought into view, which was pinched up with the forceps, carefully opened, and divided upon a director to nearly the whole length of the external wound; the forefinger of the left hand was now introduced beneath the lower margin of the internal oblique and transversalis, upon which they were divided by a probe-pointed curved bistoury to nearly the same extent. The *fascia transversalis* was strong, and required to be cautiously opened by the knife. The peritoneum being now exposed, was carefully separated and raised from the iliac fascia, and drawn towards the mesial line and retained by the aid of copper spatulæ. The vessel being now both readily felt and seen, was reached with great facility, the artery cautiously separated from the vein by the point of the knife, and the subserous tissue over the vessel gently scratched, and kept tight by the forceps, whereby the aneurismal needle passed round the artery from within outwards with great ease. Being satisfied that nothing except the vessel was included in the ligature, the needle was withdrawn and the artery secured, when instantly all pulsation in the tumour ceased. The ends of the ligature were brought out of the wound, and the edges of the incision retained in contact by four stitches, adhesive straps, a compress, and bandage. The patient, the limb being wrapped in flannel, was immediately put to bed, and had thirty minims of tincture of opium administered. He stood the operation well, behaved with great firmness and composure. Not more than two teaspoonfuls of blood were lost during the operation.

3 P. M. Feels comfortable; temperature of limb good; the tumour nearly a half less than before the operation, and much firmer.

8 P. M. Has no complaint except a little smarting in the wound; felt drowsy, but has not slept. Pulse 80, and rather sharp.

1st February. Has slept between six and eight o'clock this morning; temperature of left limb same as right; no pain; voids urine freely; has a little cough.

8 P. M. Has slept some during the day, but is now complaining of headach with throbbing of the temples; face flushed; pulse quick, skin hot, and some thirst. The house-surgeon desired to watch the symptoms, and if they did not subside, and patient continue restless, to draw blood from his arm.

2d. Has passed a good night; the symptoms existing last night having soon subsided, venesection was not required. The headach is quite gone, and pulse natural; limb warm and comfortable; no pulsation can be detected in the arteries of left leg.

8 P. M. Everything progressing favourably; had a little griping in his bowels from flatulence, for which he is ordered twenty-five minims of laudanum with half an ounce of castor oil and an ounce of peppermint water.

3d. Slept seven hours during the night, and this morning feels well and free from pain; undid the dressings from wound, which has united to a great extent by the first intention. From its lower part where the ligature is situated, there is a thin serous discharge. Pulse 84, and soft; bowels not moved. To have immediately half an ounce of castor oil, and to be repeated if necessary.

4th. Bowels were freely moved by the medicine; is free from complaint; pulse 78; tongue clean; skin cool; has some appetite for food; had bread and milk to-day for breakfast. Removed the sutures from wound, which has united to upwards of two-thirds of its extent; discharge more purulent and healthy.

5th. Everything going on well.

6th. Bowels not having been moved for two days, to take two drachms of Epsom salts, and to be repeated if necessary.

8th. Has no complaint, sleeps well, and has an appetite for food; bowels open, and tongue clean; the discharge from wound healthy; no pulsation can yet be detected in the popliteal or other arteries of the leg.

11th. Everything proceeding favourably; the aneurismal tumour reduced to about one-third of its original size, firm and unyielding; there has been no pulsation in it since the operation.

13th. Wound contracting and looking healthy; ligature still firm.

16th. Has no complaint except impatience at being kept in bed.

18th. Bowels confined. To have two drachms of Epsom salts.

21st. Was restless during the night, and to-day complains of pain in lower part of abdomen, and also in the tumour, which is slightly enlarged and more diffused, with an erythematous blush over it, but without pulsation.

22d. There is still some pain, redness, and diffused swelling around the tumour; pulse natural, and general health good; bowels confined. To have castor oil, and apply an emollient poultice to tumour.

23d. Bowels were freely opened by the oil; has slept some during the night; fluctuation is perceptible in the tumour to-day. Continue the poultices.

24th. Has slept very little during the night; the pain, swelling, and redness at top of thigh much increased. Pulse 90, and firm; less appetite, and some thirst. To have immediately five grains of calomel and fifteen grains of jalap.

25th. All the symptoms greatly aggravated to-day, the inflammation having extended all over top of thigh and hip. The wound, which had closed to about half an inch, has lost its healthy appearance, and is now plugged up with a firm whitish matter; no healthy discharge; pulse 116, and firm; tongue white; has much thirst; skin hot; complains of severe headach, and at times talks incoherently; bowels have been only partially moved by the medicine. To be bled immediately from the arm until syncope threaten, and to take an infusion of senna with Epsom salts until the bowels be very freely opened; the erysipelatous surface to be brushed over with tincture of iodine.

9 P. M. Was bled to eleven ounces; blood buffy and slightly cupped; headach much relieved; face less flushed; no extension of the inflammation at the top of the thigh; bowels have been four times moved; pulse 90, and soft. To have immediately a draught containing *Tr. Opii Vin. Ipec.* āā ʒss., *Aq. Acet. Ammon.* ʒij., *Aq. font.* ℥i. M.

26th. Has passed a good night; swelling and redness more circumscribed. Since last night there has been a good deal of bloody serous discharge from wound; pulse natural; skin cool, and feels comfortable; bowels confined. To have castor-oil immediately.

27th. Has slept the greater part of the night; the pain, swelling, and redness over tumour greatly less.

28th. While taking breakfast this morning, and after having passed a good night, said he felt as if something had given way at the top of his thigh. On removing the dressings, blood was found to be issuing from the wound; about six ounces might have been lost when it ceased. The aneurismal tumour is much increased in size since yesterday, more painful, and assuming a livid hue. Bowels open; pulse natural.

1st March. Dark grumous blood, with fetid bloody purulent matter, are being discharged from the wound, which looks very unhealthy, and increasing in size from disunion of the cicatrix. The tumour is still more swollen and livid.

2d. Less discharge from the wound, but more purulent; tumour soft, fluctuating, and more pointed. Slept some during the night; has an appetite for food; tongue clean; no thirst; pulse natural; bowels open.

About three o'clock this afternoon patient felt something warm in the situation of the wound. On examination blood was found coming from under the dressings. The house-surgeon was in immediate attendance, and, on uncovering the wound, found blood issuing from it with considerable force,but not in jets. Pressure was applied to the wound, when the hemorrhage ceased. I was immediately summoned, and soon arrived. On removing the pressure there was no further discharge of blood; the wound was filled with coagula. Upon these being removed, and the finger introduced, it passed readily to where the artery was tied; the ligature still remains firmly attached, but near it no pulsation can be felt. On turning the finger downwards from the external opening, it passed readily beneath Poupart's ligament in the course of the femoral vessels, towards the situation of the aneurism; there was no further hemorrhage. Both these sinuses were carefully stuffed with lint, a graduated compress applied over the wound, and retained by a spica bandage. About a pound of blood might have been lost upon this occasion. The tumour, which continues to increase in size and lividity, to be kept constantly wet with spirit lotion.

8 P. M. The medical officers of the institution having been this evening summoned to a consultation to consider what was most advisable to be done in the threatening aspect of the case, the following proposals were made:—*First,* to anticipate what must necessarily very soon happen,—to lay the tumour freely open,—remove all the coagula, &c., and endeavour to find the vessel whence the blood proceeded, and secure it by ligature; for there appeared no doubt but that the blood came from this situation, and not from the upper part of the wound where the ligature was applied. This, however, was deemed quite impracticable in the morbid condition of the parts at the top of the thigh. The *se-*

*cond*, both more rational and more practicable, was, to enlarge the wound in the abdominal parietes, and secure the common iliac artery. This, indeed, might have been attended with considerable difficulty from the adhesion of parts consequent upon the previous operation, but in my opinion the peculiarly hazardous situation of our patient not only warranted, but even demanded such a procedure. This proposal, however, was also overruled, and a resolution come to, that in the meantime no further operation was advisable.

3d. Has slept a good deal during the night; tumour less tense; no farther hemorrhage.

8 P. M. There is a considerable discharge of bloody purulent matter escaping from the wound, in which the plugs still remain; in other respects the same as in the morning.

4th. Has passed a pretty good night; pulse 78 and soft; tongue clean; bowels confined; has a little appetite. The skin over tumour is very thin, and has an emphysematous feel. To have castor oil immediately.

5th. Bowels have been freely moved by the oil; patient has slept a good deal during the night, and feels more comfortable this morning. The skin, at two points over the tumour, is extremely thin, and of a dark-purplish colour; the surrounding inflammation greatly less.

6th. Has passed another good night, but complains this morning of more pain in the tumour, which appears to be on the very verge of giving way. The wound in the abdomen, which had almost completely cicatrized, is now disunited to nearly its original extent, looks very unhealthy, and discharges fetid bloody purulent matter.

7th. Has passed rather a restless night from the pain in the tumour, the skin over which has become so extremely thin, and of so dark a colour, that it may be expected to give way every minute. The discharge from the wound more healthy. Bowels confined. To take immediately castor oil—two drachms.

8 P. M. At 3 o'clock this afternoon the sloughs over tumour gave way, when a large quantity of very fetid purulent matter, mixed with dark clots of blood, was discharged. Bowels have been moved by the oil. Let a warm poultice be applied to the tumour; to take at bed-time twenty minims of solution of muriate of morphia.

8th. Has slept well during the night, and feels comfortable this morning; pulse 76 and very compressible; tongue clean; has some appetite. The aneurismal tumour greatly reduced in size, and discharging very freely of more healthy purulent matter. On removing the stuffing from the abdominal wound to-day, the ligature was discharged without any hemorrhage. To have chicken soup for dinner.

9th. Has not slept so well, but has no complaint, the sloughs separating from the tumour at top of thigh. Bowels confined. To take a compound colocynth pill when necessary. To have an egg for breakfast.

10th. At half-past seven o'clock this morning a considerable discharge of florid blood took place from the sore at top of thigh, which, however, soon ceased; patient looks pale, and pulse feeble. To have a little port wine frequently.

10 P. M. No farther hemorrhage. Continue the wine.

11th. Has slept very well during the night; the sloughs have now almost entirely separated, and both sores are looking clean, and discharging freely of healthy purulent matter; no hemorrhage; pulse very compressible; tongue clean; bowels open; has a good appetite; and has taken six ounces of wine since yesterday.

2th. About one o'clock this morning blood again burst with considerable force from the ulcer at the top of thigh, which was, however, soon arrested by the house-surgeon compressing the spot with his finger. On my arrival I found the patient very feeble, the pulse fluttering, and his countenance pale and anxious. On carefully examining the point whence the blood proceeded, I found it issuing from the inner side of the ulcer, nearly over the course of the common femoral artery. It was evidently arterial, and welled up in a large and continuous stream, notwithstanding the greatest care, by separating the granulations, &c. we could not detect the mouth of any bleeding vessel. An attempt was made to embrace the vessel in a ligature by passing an armed curved needle in the direction of the point whence the hemorrhage came. This effort, however, proved unsuccessful, and the only resource left was to apply a graduated compress to the point, and a spica bandage, which completely arrested any further bleeding. Countenance very pale and anxious; pulse very feeble; has lost at this time from 12 to 15 ounces of blood. To have a little brandy occasionally.

3 A. M. Patient appears to be weaker; pulse more feeble and compressible; no further hemorrhage. From this time he became gradually weaker until five A. M., when he died.

*Post-mortem* examination 27 hours after death.—The arteries of the affected limb were injected from the common iliac without removing the bandage and compress which had been applied to arrest the fatal hemorrhage, and on removing these, some of the injected matter was found imbedded in the ulcer at the top of thigh, at the point whence the flow of blood had proceeded.

On enlarging the wound in the abdominal parietes, and tracing the arteries in the pelvis, the branches of the internal iliac were found to be completely injected, while none of the injection had passed into the external iliac. This artery was, on the contrary, quite impervious and much contracted, while it contained a firm fibrinous coagulum, from where the internal is given off to the point of ligation; about one-third of an inch above and below this point, the vessel was surrounded and firmly closed by coagulable lymph; below this, as far as the seat of the aneurism, the vessel was contracted, impervious, and contained some coagulated blood.

The superficial femoral artery in the thigh was found fully distended with the injected matter, as was also the common femoral, on the outer side of which was discovered an opening about a quarter of an inch in length, having ragged edges, and communicating directly with a small digital-looking cavity, situated on the inner side of the ulcer. At this spot a quantity of the injection was found impacted, and evidently prevented from altogether escaping only by the compress and bandage, which had been applied to arrest the hemorrhage. The profunda was given off at little more than one inch below Poupart's ligament, instead of two inches as is usual; it also was thoroughly injected, as were its branches, as far as they were traced; the circumflex were palpably larger than natural, and full of the injection. A sinus from the abdominal wound extended downwards, along the tract of the femoral vessels, beneath Poupart's ligament, sufficiently large to admit the finger easily, and communicating with the ulcer at the top of the thigh. The size of the ulcer in the seat of the aneurism was, in its longest diameter, from the pubis to the ilium, about four and a-half inches, and about three from above downwards; the granulations, which at one time looked florid and healthy, had become dark and sloughy.

This case is interesting in many points of view, but especially in respect to its fatal termination and the source of the hemorrhage. There cannot be a doubt but that the ligature was most satisfactorily applied to the external iliac, and that, for the time, all circulation through the aneurism was completely stopped. Nor can there be a doubt that for the first three weeks a very different result might with confidence have been anticipated, every thing having progressed most favourably until the 22d day after the operation, when some swelling and redness were observed over the tumour; but no pulsation was then, or indeed at any future period, felt in the tumour. The inflammatory symptoms did not for some time excite much apprehension, for it was both my own opinion, and the opinion of those who saw the patient along with me, that the sac would probably suppurate, and thus get rid of the tumour by a shorter, although a more troublesome and painful process than that of absorption. It was only on the 28th February, 29 days after the operation, that any apprehensions of serious hemorrhage were entertained. At this time great doubt and uncertainty prevailed as to the source of the hemorrhage. Ulceration of the vessel on the cardiac side of the ligature being generally the cause of such effusions, especially so long after the operation, was suspected. On the 2d March, however, this was satisfactorily found not to be the case, for, on examination with the finger, the vessel both above and below the ligature was felt to be firm and quite free from any pulsation; while a sinus was detected leading downwards and communicating with the aneurismal sac, shewing that it was from this quarter the blood had proceeded, and that the sac having received a supply of blood from some source or other had burst upwards, and discharged it by the external wound, but by what channel it had reached the aneurism was still a problem difficult of solution. Hodgson in his valuable treatise on diseases of arteries, states that "the blood which enters the sac after the ligature of the artery at a distance from the disease may be derived from three sources. 1st, It may enter the aneurism from the superior extremity of the artery into which it was transmitted through anastomosing branches opening into the trunk between the sac and the part at which the ligature was applied; 2dly, It may pass into the tumour in a retrograde course through the inferior extremity of the vessel; and 3dly, It may be conveyed through anastomosing branches which open into the sac itself." Again, he says that "if an aneurism be situated below the epigastric a stream of blood will enter the femoral artery above the tumour, after the ligature of the external iliac, but this stream will not be sufficient either in quantity or in force to continue the disease." In such cases, however, as those last referred to, pulsation in the tumour, either immediately or soon after the operation, is always perceived, although it ceases after some days, as was strikingly remarked in Sir W. Newbigging's case, recorded in Vol. xii. page 71 of this Journal. In this case, however, the absence of all pulsation in the tumour, and, when the hemorrhages took place, the flow of the blood in a continuous stream, without the usual arterial jet, confirm me in the opinion that the blood passed from the branches of the internal iliac into those of the profunda, retrograded into the common femoral, and thence into the sac, according to the second of the channels pointed out by Hodgson.

Being satisfied that the aneurismal sac was supplied in the manner I have attempted to shew, it would appear that two operations might have been undertaken to arrest the hemorrhage; 1st, tying the common femoral immediately above its bifurcation; or 2d, securing the common iliac. The former I imagine to have been quite impracticable in consequence of the swelling, inflammation, and sloughing which existed at the top of the thigh; but I do regret that the latter, the tying the common iliac, was not adopted agreeably to what I urged at the consultation on the 2d March. Had this been done an additional chance of life would have been given to the patient; for when the blood again broke forth on the 12th, no time was afforded for operation, as he died within four hours from the attack, notwithstanding that all farther effusion was speedily and permanently arrested.

9 *Tay Street*, *Dundee*,
*26th November* 1845.

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## ART. III.—*Case of Ovarian Disease, in which both ovaries were excised, terminating fatally on the seventieth day, by strangulation of the small intestine.* Reported by JOHN HUGHES BENNETT, M. D., F. R. S. E., Lecturer on Pathology and the Practice of Physic; and P. D. HANDYSIDE, M.D., F.R.S.E., Consulting Surgeon to the Royal Infirmary, Lecturer on Anatomy, &c. (Read before the Medico-Chirurgical Society, December 3, 1845.)

### HISTORY OF THE CASE PREVIOUS TO THE OPERATION. BY DR BENNETT.

JESSIE FLEMING, unmarried, aged 20, residing in Crail, was admitted into the Royal Infirmary under Dr Bennett, July 5, 1845, recommended by Mr Crabbe, Surgeon.

She states, that eighteen months ago she first perceived a tumour in the lower part of the abdomen, deep seated in the middle of the hypogastrium. She remembers that she could push it aside in various directions without pain, and that at this time it was about the size of an orange. She can assign no cause for its appearance. The tumour rapidly increased in bulk, until at the end of ten months the abdomen was greatly distended, so much so, that respiration and progression were rendered difficult. Paracentesis was now performed, and forty imperial pints of a viscid yellowish-coloured fluid were removed. The abdomen, however, again rapidly increased in size, and paracentesis was again had recourse to. The operation has now been performed six times, the intervals between each becoming less and less lengthened, and the amount of fluid, though always considerable, varying in amount. She says that immediately after every tapping a tumour can be felt about the size of a child's head on each side of the abdomen; that these tumours (she thinks there are two,) are moveable laterally, but seem to grow from below. She thinks the one on the left side is larger and higher up than that on the right. Her general health has been little affected by the disease.

At present, July 6th, she complains of pain in the head, which is stated to be dull and heavy, and seated principally over the forehead. It comes on occasionally, and lasts for three or four days at a time. She has pain in the loins very frequently, especially when the dropsy is large. Special senses and common sensibility normal. Her sleep is much disturbed by breathlessness, and by the semi-erect posture the dropsy requires. Motion is impeded by the size of the abdomen, and from its great weight. There is much muscular weakness.

The abdomen measures 48½ inches at its largest girth, which is just above the navel. It fluctuates distinctly. Dulness of the liver cannot be defined by percussion. The skin of the abdomen is marked by transverse fissures or marks of a purplish colour; it often feels very hot and as if it were bursting; tongue clean; appetite a little impaired; no thirst or sickness; bowels regular; stools somewhat fluid, but of healthy aspect; urine scanty, thick, high coloured, of acid reaction, containing a yellowish brown sediment, but unaffected by heat; skin dry, not warmer than usual. She states that she never perspires. Has no cough or pectoral complaints except dyspnœa, which is very severe at night. On auscultation the chest appears to be healthy. Pulse 88, sharp and small; heart's sounds apparently abrupt, but natural. The catamenia have appeared at irregular intervals, sometimes of three weeks, at others five weeks, and when present are profuse.

From this time she remained generally in about the same condition. The urine passed in the twenty-four hours never exceeded twelve ounces, and on one occasion was as low as six ounces. The abdomen gradually became more tense and the dyspnœa more urgent.

12th. Mr Syme performed the operation of paracentesis of the abdomen. The trocar was introduced to the left of the *linea alba*, about two inches above the pubic bone. Five imperial gallons of a yellow-coloured transparent fluid were removed. The last four ounces which came off were viscid like white of egg, and contained a few yellowish opaque flocculi. The fluid was densely coagulable on adding heat or nitric acid.

The flocculi when examined with the microscope were found to be composed not of lymph, as was at first supposed, but of numerous cells, varying in size from the $\frac{1}{100}$th to $\frac{1}{40}$th of a millimetre in diameter. The great majority were about $\frac{1}{30}$th of a millimetre. They were slightly granular, of round and oval shape, unaffected by water, but becoming more transparent on the addition of acetic acid, and exhibiting a distinct nucleus about $\frac{1}{140}$th of a millimeter in diameter. The nucleated cells were imbedded in a granular matter which could easily be broken down.

Shortly after the operation, she complained of considerable pain in the abdomen towards the left side, which was not increased on pressure. Fifty minims of tincture of opium to be taken immediately.

7 P. M. Experiences pain over the abdomen analogous to cramps, not increased on pressure. Pulse between 70 and 80.

℞ *Opii* gr. i.; *Pulv. Antim.* gr. ij.; *Con. Aromat. q. s. Ft. pil. 4ta hora sumend. Mittantur* vi.

13th. To-day has felt considerable trembling and faintishness, which were relieved by tightening the roller. Bowels not relieved since yesterday morning; pulse 100; pain in abdomen very slight, not affected by pressure; has passed forty-eight ounces of urine since yesterday; vomited her breakfast; tongue much furred.

The pills were stopped; and one drachm of the compound jalap powder was directed to be taken immediately.

14th. Passed a good night, and has now no pain in the abdomen; but there is considerable tenderness on pressure towards right side, where the swelling appears to be greatest. Passed fifty ounces of urine. No powders have been taken since the morning of the 12th. Bowels freely opened by jalap powder. Breathlessness.

15th. Passed a restless night, having experienced much nausea and vomiting. She also felt considerable pain in the right iliac and hypochondriac regions. The pain still exists, and she says is much increased on pressure. The source of pain is very deep-seated; is certainly not in the peritoneum. The puncture is now healed; the abdomen is still voluminous, but soft. On palpation, a tumour with distinct margins, about the size of the adult human head, may be distinctly felt, firmly attached inferiorly within the pelvis, but its upper portion moveable to a considerable extent from side to side. She describes the pain as being of a dull, gnawing, and continued character; not lancinating nor increased on movement. Pulse 98, of natural strength; tongue slightly furred; has tolerable appetite; no thirst, but says she vomits everything she takes. The matters vomited are thrown up about ten minutes after each meal, in successive mouthfuls, accompanied by gnawing pains at the stomach. These latter pains are felt under the false ribs on the right side. The stomach is often felt to be distended, followed by considerable eructations of gas; bowels have been open four or five times; urine much increased in amount since the operation; to-day she passed thirty-eight ounces. On the 10th passed ten ounces of urine, on the 17th sixteen ounces. The compound jalap powder was directed to be given again.

July 18th. To-day she was carefully examined by Professor Simpson, who employed his uterine bougie. By this means the fundus of the uterus was raised above the brim of the pelvis, where it was distinctly felt presenting its obtuse, rounded, natural form. The Professor stated his opinion that the tumour was connected to the left ovary by a narrow pedicle. Urine ten ounces.

19th. The examination of yesterday was followed by great pain. She described this as being "tremendous," and seated in the back. The nurse says she cried out as a woman in labour. About two and a half hours afterwards a draught containing one drachm of solution of morphia was given. It relieved the pain, but it continued until 11 P. M. An anodyne and ether draught was then given, which was immediately rejected by vomiting. Since the examination the vomiting has been more urgent; everything taken has been brought up *en masse*, and there is still dull pain on pressing deeply into the right hypochondriac and iliac regions. Urine sixteen ounces.

The powders were stopped. She was directed to take three times daily one ounce of a mixture consisting of one drachm of medicinal naphtha, three drachms of tincture of foxglove, three of spirit of nitrous ether, and five ounces of water.

20th. Urine twelve ounces. 21st. Urine ten ounces; still complains of vomiting.

Seven leeches were applied to the epigastric region.

22d. Leeches bled well; vomiting continues; it comes on now ten minutes after taking meals, but sometimes sooner; it is more quickly excited when fluid is taken than when solid food only is swallowed; for the last eight months has had occasional vomiting, and since entering the house it has become more frequent and continued; no pain on pressure of the epigastrium; the stomach is much distended with air; there is frequent eructation of gas in considerable quantity; twenty ounces of urine passed since yesterday's visit; the fluid in the abdomen is again increasing; the tumour can be felt very moveable; it can be pushed freely from one side of the abdomen to the other, and seems only attached by a long pedicle; considerable pain in back. Continue powder.

℞ *Pulv Opii* gr. ij.; *Creosoti.* gtt. ij. *Ext. Taraxaci q. s.*
*Ft. pil.* ii. 1. *h. s et post hor.* vj. *si opus sit.*

23d. No vomiting yesterday after the visit. Complains of pain in the back and some cephalalgia. Passed thirty-six ounces of urine.

A plaster of extract of belladonna was applied.

24th. Urine eighteen ounces; presents a more copious sediment of urate of ammonia; it is high coloured. Acid reaction on litmus; copious orange-coloured sediment, which is dissolved on addition of heat or nitric acid; no vomiting.

25th. Urine twelve ounces. 26th. Urine eighteen ounces. 27th, Urine twenty-four ounces. 28th. Urine sixteen ounces. 29th. Twenty-two ounces. 30th. Twenty-six ounces. 31st. Ten ounces. August 1. Urine sixteen ounces.

August 7th. Since last report the amount of urine passed daily has diminished to from ten to twelve ounces, whilst the increase of fluid in the abdomen has gradually rendered respiration difficult. To-day this fluid was removed by Dr Duncan. A trocar was introduced in the mesian line, above the pubes low down. Five and a half gallons of yellow slightly viscid fluid were removed. Towards the end the viscidity of the fluid was increased, and flocculi, as on the last occasion of tapping, were observed. Examination of the flocculi microscopically presented the same appearances as on the last occasion. Fluid the same chemically.

Soon after the operation she experienced considerable pain in the back and over superior portion of abdomen, which was not increased by pressure. Pulse became quick and full. At 8 P. M. she had experienced no relief, and was ordered half a drachm of the solution of muriate of morphia in the form of draught immediately, and repeated at midnight if necessary.

August 8th. The pain ceased at midnight. Had little sleep. To-day slight pain under false ribs of left side; otherwise easy. Pulse natural. She has passed more than fifty ounces of urine.

August 9th. Passed a good night; slight pain in abdomen on pressure. Amount of urine less than yesterday, but not measured.

August 16th. Since last report has been in the Surgical Hospital. Dr Bennett proposed to the acting-surgeons severally the operation of ovariotomy, which they declined to perform. To-day, accordingly, she returned to the medical ward. During the interval her general health has been good. The fluid in the abdomen, however, is again accumulating. By a careful examination the tumour can be ascertained to be quite free from adhesions to the anterior walls of the abdomen. These latter can be pulled forwards and held steady, while the tumour is made to roll free beneath. Passed during the last 24 hours eighteen ounces of urine. The liver was carefully percussed. Its extreme dulness in the right hypochondrium is three inches; it is pushed considerably upwards, the upper line of dulness being on a level with the nipple. She denies ever having suffered from dyspeptic symptoms, or so-called attacks of bile; and her general health is in every respect good, and the amount of urine discharged diminishing. Her general health is not so robust as when she first entered the house.

Dismissed from the infirmary August 24th. The fluid of abdomen somewhat increased in amount.

September 2d. After leaving the house she went into lodgings, having been placed by Dr Bennett under Dr Handyside's care. The fluid gradually accumulated again, and for the last three days has rendered respiration difficult. Yesterday, paracentesis was performed by Dr Handyside, and about four gallons of fluid were removed. The character of the fluid was exactly the same as on former occasions, except that the flocculi were not so large and numerous. About an hour after the operation considerable pain in the abdomen came on, which continued until 2 A.M. this morning, notwithstanding two anodyne draughts. To-day is free from pain. Slight cephalalgia. Bowels not open since yesterday morning.

September 3d. This evening a consultation was held; present Dr Handyside, Dr Simpson, Dr Spittal, Mr Crabbe, and Dr Bennett. Patient is doing well; no pain; tumour very moveable, and distinctly felt, as after previous tappings. The propriety of ovariotomy was agreed on, Dr Handyside having now satisfied himself that this was a case urgently calling for the performance of that operation, and feeling that he could no longer conscientiously decline the proposal to this effect, previously made to him by Dr Bennett. To have half an ounce of castor oil.

September 4th. Partly vomited castor oil. Bowels open only slightly; is in good spirits; face pale and a little anxious.

℞. *Ext. Colocynth. c.* gr. x.; *Ext. Hyoscyam.* gr. v. *Ft. pil.* iii. s.s. A domestic enema in the morning.

September 5th. Bowels opened four times during the night, the last time at 8 this morning. In good health and spirits. Tongue clean. To-day the operation was performed by Dr Handyside, in the presence of Dr Beilby, Dr J. Y. Simpson, Dr W. Campbell, Dr A. D. Campbell, Dr Baillie, Dr Bennett, Mr Goodsir, and Dr Struthers.

## DESCRIPTION OF THE OPERATION AND SUBSEQUENT TREATMENT UP TO OCTOBER 3D. BY DR HANDYSIDE.

The operation was performed at half-past 12. The temperature of the room was raised to 72°. The patient was placed on a table before a good light, her feet resting on a stool, and her shoulders raised and supported by pillows. The other necessary arrangements for the operation having been made, Dr Handyside, now, standing to the right side of the patient, made, with a strong scalpel, an incision of about three inches in length through the skin and subcutaneous cellular tissue, midway between the umbilicus and pubis, and over the *linea alba*. This incision was deepened carefully, the *linea alba* divided, and the peritoneum reached. A fold of this membrane was pinched up with the forceps, and a small opening made into it. Through this opening some glairy fluid escaped, indicating that the cavity of the abdomen had been opened. With a probe-pointed bistoury the peritoneum was now slit open to the extent of an inch less than the external wound. A large quantity of the glairy fluid then escaped, which occasioned some delay. Through this opening Dr Handyside now introduced two of his fingers, in order to ascertain that no adhesions existed on the anterior surface of the tumour. None being felt, the wound was now dilated upwards for other three inches. This was done with a probe-pointed bistoury, which was guided by two fingers introduced into the abdomen. Through this opening Dr Handyside now introduced his whole hand, in order to ascertain whether the tumour was adherent at any part of its surface. The hand was passed over, around, and down to the pedicle of the tumour, and the latter was found to be attached only by its pedicle, which was felt to be small. The operation was therefore proceeded with. From the size of the tumour it was evident that a large opening was required for its removal. Accordingly, the wound was extended upwards to rather more than midway between the umbilicus and the ensiform cartilage, and downwards to within two inches of the symphysis pubis,—the probe-pointed bistoury being employed as before. In dilating upwards, the umbilicus was avoided, the incision passing to the left side of it. Through the large opening the fundus of the tumour now presented, and the charge of it was committed to Professor Simpson, who drew it gently outwards. At this time, as well as before and after, care was taken to prevent protrusion of the intestines. This was done by Mr Goodsir, who, with both hands, pressed the edges of the wound downwards and backwards against the intestines and from the tumour. On the anterior aspect and fundus of the tumour were now observed several round smooth-edged apertures, through which some of the glairy fluid was seen to escape, being of the same character as that which had flowed from the peritoneal cavity, but rather more viscid in consistence. One of these openings was dilated with a bistoury, which allowed of the escape of a large quantity of the glairy fluid. This had the desired effect of diminishing considerably the size of the tumour. The pedicle of the tumour was next examined, and it was found to consist of the left broad ligament of the uterus, somewhat elongated and enlarged, but not altered in texture. The uterus was seen to be of normal size, though of a rose-red colour, and to be unconnected with the tumour, except through the medium of the ligament. The pedicle of the tumour being now put on the stretch by exerting slight traction on the latter, a strong curved needle, in a fixed handle, and carrying a strong double ligature, was passed through its middle. The double end of the ligature being divided, each half was tied separately, so that each included one-half of the pedicle.

Some delay was occasioned by the difficulty experienced in tying the ligatures, as the elasticity of the part included caused the first half of the knot to slacken before the other half could be thrown. The tumour now required to be removed. This was done by cutting carefully with a scalpel at about an inch beyond the part surrounded by the ligatures. In doing so a cyst, which had extended down to the pedicle, was necessarily opened, and some more of the glairy fluid escaped. During the division of the pedicle venous blood escaped freely from the tumour, but, after the removal of that latter, no bleeding occurred from the divided surface of the pedicle, although the mouth of at least one large artery was visible. The right ovary was now examined, and it was found to be enlarged to the size of a walnut, and to contain several small cysts. Accordingly Dr Handyside proceeded to remove it also. A needle carrying a double ligature was passed through the middle of the ligament of the ovary, and the ends tied separately in the same manner as on the other side. No bleeding followed the division of the ligament beyond the ligatures. The portions of the broad ligaments which were left were unaltered in structure. The four ends of ligature attached to each broad ligament were now tied together around the latter, and then three of the ends cut off so as to leave one only from each side hanging at the lower angle of the wound. The blood mixed with the remainder of the glairy fluid was now sponged carefully out of the lower part of the abdomen and the pelvis, which were exposed. The peritoneum lining the abdominal wall, as well as that covering part of the intestines, was now examined, and seen to be of a red colour, as from congestion or chronic inflammation; but on no part was there any mark of the effusion of lymph. Beneath the part of it which lined the abdominal wall, the appearance as of numerous ecchymotic spots was visible.

Part of the intestines which were seen towards the termination of the operation, though they did not protrude, were quite natural in their appearance. All oozing of blood from the incisions in the abdominal wall having ceased, no vessel having required ligature, the edges of the wound, with the careful exclusion of the peritoneum only, were approximated and retained in accurate apposition by means of twisted sutures, ten of which were employed. Corresponding parts of the edges of the incision were indicated by the dark points and cross lines which were previously marked with the nitrate of silver, and which, on the now flaccid skin, were found to be of great use. A long pad of tint was now laid, as a compress, along each side of the wound, and a lighter one over it, and these were retained by broad strips of adhesive plaster. Lastly, over these pressure was made, and support given, by the ends of a double many-tailed bandage, which had been placed under the patient before the operation began, and which were crossed and pinned alternately at opposite sides of the abdomen. The patient was then placed in bed, a dry blanket having been previously wrapped round the thighs and pelvis. The patient bore the operation well. At one time she felt faint, but syncope never occurred, so that no stimuli were given. The pulse never sunk below 80, but remained most of the time between 90 and 100. The operation occupied in all about forty minutes. Fifteen of these were occupied in the preliminary incision, examination and removal of the large tumour,—five in the removal of the small one, and twenty in sponging out the pelvis, introducing the sutures, and applying the compresses, straps, and the many-tailed roller.

September 5th,* 1½ P. M. Pulse 60.

To have one drachm of the solution of muriate of morphia.

3 P. M. Pulse 90, and of good strength.

4 P. M. Pulse 90, and full. She complains of acute pain of abdomen. To have two grains of solid opium in pill.

8 P. M. Pulse 100, and full. To have another grain of opium.

9 P. M. Pulse 100, and soft. The pain of abdomen now ceased on her being turned in bed. Eight ounces of urine withdrawn by the catheter, several ounces having been passed at 5 P. M.

12 P. M. Pulse 100. She complains of thirst. She has had no sleep as yet.

To have one drachm of the solution of muriate of morphia.

6th, 1 A. M. She complains of sickness, and has made some efforts to vomit. For this a drop of hydrocyanic acid was given.

3 A. M. She has had some more vomiting. The fluid vomited is thin, and of a green colour. No sleep as yet.

To have half a drachm of the solution of muriate of morphia.

10 A. M. She has lain in a drowsy condition during the night, but has had no sleep. Pulse 122, of moderate size, and soft; tongue rather dry; less pain of abdomen. Four ounces of urine withdrawn, some having been passed during the night.

2 P. M. Pulse 134, full, but soft. Complains of difficulty of breathing, from a feeling of constriction of the chest.

9 P. M. Pulse 148, full, and rather strong. Difficulty of breathing increased. Pain of abdomen less. She was now bled from the arm until the pulse became soft and compressible. She was bled in the recumbent posture, and twenty ounces were taken. After the bleeding the breathing became easy. Was ordered twenty drops of black drop.

11 P. M. Pulse 160, small and vibrating. She has passed urine twice during the day.

7th, 9 A. M. She has had some hours sleep towards morning. Passed urine freely during the night. Pulse 130.

2 P. M. Pulse 140. She has as yet taken no nourishment since

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* From this time up to the 15th the case was treated in consultation by Drs Handyside, Bennett, J. Y. Simpson, W. Campbell, and Messrs Crabbe and Goodsir.

the operation, except a little warm coffee. To have some warm gruel. Fifteen drops of the "black drop" were now given, as she was restless and irritable.

9 P. M. Pulse 130. Has passed urine three times during the day,—the quantity each time being about four ounces. The bandage was now loosened for the first time. Some sero-purulent fluid oozed from around the ligatures. Except where the latter intervene the wound seems to be united throughout. The bandage was replaced, as she complained of a feeling of tightness of the abdomen. To have some beaf-tea and toast.

8th, 9 A. M. She has slept several hours during the night, and passed urine twice; pulse 120, and not so soft as before; skin hot and dry; complains of griping pain in abdomen; no motion of the bowels as yet. An enema of warm water to be administered.

2 P. M. Pulse 120. The enema has acted twice, but no intestinal matter has come with it. Griping still continues. The compresses were removed, and the wound dressed for the first time. Union by the first intention has taken place throughout, except where the ligatures interpose. Some sero-purulent fluid oozed from around the latter. Light compresses were applied along the side of the wound, and retained by a few straps, and the bandage was again replaced.

9 P. M. She has slept some time since last report. Passed urine twice during the day; bowels again moved in the afternoon, but no fæces in the stool; pulse 120.

It may be here stated, to save repetition, that she continued to pass urine regularly and freely, the quantity gradually increasing.

9th, 9 A. M. She has passed a good night, but her sleep has been occasionally interrupted by tormina, which caused several watery stools, with the passage of flatus. Pulse 120; skin cool. Has had some arrow root with new milk. She has also been troubled with flatulence and eructation, for which she was ordered half a wine glassful of a mixture of equal parts of milk and lime water occasionally, and she is to have "Dalby's carminative," one drachm for a dose, if the flatulence continues.

2 P. M. After a dose of each of the above the tormina and flatulence diminished. The wound was again dressed. The tepid water dressing was applied to the lower part of the wound. No tenderness of abdomen.

9 P. M. Had bread with milk to dinner. Bowels moved, and feculent matter in the stool.

10th, 9 A. M. She has slept a good deal during the night. Pulse 130, and soft; respirations 35; tongue white and furred; complains of tormina; wound discharging freely around ligatures. The three lower alternate needles were removed, and their places supplied by straps of adhesive plaster. To have chicken broth for dinner.

1 P. M. Complains of great tormina and restlessness.

℞ *Bismuthi Albi* ʒss.; *Olei Anisi* m. iij.; *M. et divide in pil.* vi. One of which she is to have every three hours.

6 P. M. She has had since last report two copious feculent stools. She is now irritable and restless; skin dry; tongue furred; expression anxious.

Let her have three grains of genuine James' powder with two grains of calomel.

9. P. M. Pulse and general condition as before. There is now tenderness of the abdomen, which is elicited by pressure over the iliac regions. This was the first symptom of local inflammatory action.

Twenty-four leeches were ordered to be applied,—and after the bleeding let her have gr. iij. of the *Pulv. Jacobi Ver.* and gr. i. of opium in pill, which is to be continued till the pain is abated and the frequency of the pulse diminished.

11th, 9 A. M. The leeches bled well last night. One of the pills was given, and in addition, two grains of solid opium during the night. After the bleeding she felt relieved, and she has passed a tolerable night; pulse 130, but softer; respirations 35, easy and full; skin moist; iliac region still the seat of pain though less than before.

Twenty leeches to be applied, after which let her have three grains of genuine James's powder, with half a grain of opium, which is to be repeated at noon. To allay thirst let her have some soda water with raspberry vinegar for drink.

2 P. M. Leeches bled freely, and she feels again relieved. The remaining sutures were removed, and union by the first intention is found to have taken place throughout. Discharge from around the ligatures free. Had milk and tea with rusk to breakfast, and to have broth for dinner.

9 P. M. Pulse 128; respirations 22.

12th, 9 A. M. Has had three of the opiate pills. Slept several hours towards morning; starts during her sleep, and awakes unrefreshed; pulse 120; tongue covered with whitish fur; skin warm and moist; wound discharges small sloughs of a blackish colour amongst the pus.

9. P. M. Pulse 120. Has had two opium pills during the day. She has slept occasionally. Bowels not open. To have half an ounce of the electuary of senna, and afterwards the yolk of a soft boiled egg.

13th, 9 A. M. Has passed a pretty good night. Bowels not yet moved, but she had an enema of warm water, which has just come away, but without bringing any fæces with it. Pulse 116; tongue cleaner. To have half an ounce of castor oil.

9 P. M. Has had five bilious stools since the castor oil was given. Feels much relieved. Has had beef-tea for dinner.

Pulse 108; tongue cleaner; has occasional hiccough; flatulent distension of the abdomen, which appeared yesterday, has subsided. To have sixty drops of the *Sol. Mur. Morph.*

14th, 8 A. M. Has slept several hours during the night; pulse 108.

10 A. M. Pulse 120. Has taken an egg with rusk and coffee to breakfast. Wound discharging freely.

9 P. M. Pulse 102. Has had four scanty bilious stools since morning; complains of tormina and eructation.

15th, 9 A. M. Has had no sleep during the night; pulse 100; skin natural. To have two of the bismuth pills ordered on the 10th instant, and some beef-tea.

9 P. M. Has had two scanty motions of the bowels; no eructations since the bismuth was taken; pulse 118. To have twenty drops of the Lancaster black drop. To have farinaceous food only for the present.

16th, 9 A. M. Has had several hours sleep. Has had other two bismuth pills, as the eructation returned during the night. Wound discharges freely sero-purulent matter, mixed with dark flocculi; pulse 108.

9 P. M. Has had one free motion of bowels. Has had other two of the bismuth pills. To have one drachm of the *Sol. Mur. Morph.*

17th, 9 A. M. Has slept well during the night; pulse 118.

9 P. M. Pulse 120; tongue natural; she feels comfortable.

18th, 9 A. M. Has passed a restless night; but has no particular complaint except a little cough. Bowels once opened during the night; pulse 120. On auscultation no abnormal sounds could be detected. A sinapism to be applied to the sternal region.

9 P. M. Cough still present; pulse 120, full and soft. To have one grain of opium with three grains of James's powder instead of morphia; and to have a bottle of hot water to the feet. Bowels twice opened during the day.

19th, 2 P. M. Passed a good night. Had beef-tea and calf's-foot jelly for dinner. Pulse 120; has still a little cough; discharge from wound very free, amounting to about three ounces at each dressing.

20th, 2 P.M. Had 80 drops of the *Sol. Mur. Morph.* last night. Slept well; pulse 112; tongue covered with whitish fur, but moist skin, rather hot and dry; bowels open.

21st, 9 P. M. Was restless last night. She is annoyed by irregular cough; had three motions of bowels during the day. Has had 20 drops of the black drop, with the yolk of an egg. Sinuses discharging freely.

22d, 9 P. M. Feels better; pulse 120; skin cool; tongue clean. Had two ounces of steak allowed for dinner to-day, with beef-tea and toast.

23d, 9 P. M. Had an opiate last night, after which she slept well. Has been restless during the day, with want of appetite; pulse 120; discharge free. About three and a-half ounces of pus escaped at the dressing. The pus escapes more freely when she is raised in bed, and when slight traction is made on the ligatures. Cough continues; no expectoration; no râles audible in chest.

24th, 9 P. M. Slept well last night after the usual opiate. Had two ounces of minced collops for dinner. Appetite rather improved; bowels open; pulse 120, and sharp. To have 15 drops of the black drop, with one drachm of the *Aq. Acet. Ammon.*

25th, 9 P. M. Slept well last night. Had dinner to-day as yesterday. To have a little porter. Draught to be repeated to-night.

26th, 9 P. M. Feels better to-day; pulse 116; tongue clean; respirations 32, and thoracic; appetite improved; bowels open thrice during the day.

27th, 9 P. M. Had her opiate last night, and slept well. Has been troubled a good deal with eructation. She is now able to sit up in bed during her meals, and to read in bed.

28th, 9 P. M. Slept well after the draught last night. Eructations removed by a dose of the hydrocyanic acid. Bowels open twice during the day, and with tormina. For this she had 20 drops of the *Sol. Mur. Morph.* in half a glass of wine, made into negus. She sat up in a chair to-day and read for some time. The cough is now attended with slight mucous expectoration, but there is no pain of chest. Discharge less to-day. To have a grain of opium with three grains of James' powder, and to have no more malt liquor at present.

29th, 9 P. M. Slept well last night, but has been troubled a good deal with cough during the day. There is a scanty expectoration of clear, and sometimes of tough greyish-yellow tenacious mucus. She complains of soreness of the throat, extending down the larynx and trachea, but the fauces seem natural. On examination of the chest, the respiratory sound is normal, but loud anteriorly, and especially in the upper parts of the chest. In the lateral regions it is less distinct; and posteriorly, especially in the lower parts, very feebly heard, and it is there almost inaudible during expiration. There are a few sonorous râles in the anterior part of the right axilla, on a line with the nipple, during inspiration. Pulse 112. To have a grain of opium.

30th, 9 P. M. Feels easy; appetite improved; still some cough; pulse 120. To have 20 drops of the black drop, with a drachm of the *Aq. Acet. Ammon.*

October 1st, 9 P. M. Slept well last night; bowels open; pulse 130. To have an opiate.

2d, 9 P. M. She feels weaker, and has less appetite to-day; but still took two ounces of roast mutton with bread for dinner. Bowels thrice opened during the day; pulse 120. To have a grain of opium.

### THE REMAINDER OF THE CASE IS REPORTED BY DR BENNETT.

October 3d,* 2 P. M. Dr Bennett on again taking charge of the patient found her pulse 120, weak; the discharge from the wound copious and fœtid; considerable diaphoresis and diarrhœa, the bowels having been open four times since last night's visit; and with loss of appetite. To have half an ounce of wine every two hours until the evening.

9 P. M. Has taken the wine regularly. Face somewhat flushed; pulse 112, of greater force; appetite improved; bowels open twice since morning visit. When she coughs air is sucked in, and forced out of the wound during expiration and inspiration. She feels the ligatures gnawing. On pulling the right ligature gently it came away together with a slough about three inches long, and the diameter of a crow quill. A quantity of pus followed, but no blood. The end of the ligature embraced the two loops which enclosed the halves of the pedicle. Immediately after the dressing the pulse was counted to be 132; ten minutes after it sunk to 114. This is the twenty-ninth day after the operation. To have a grain of opium. Omit wine.

4th, Notwithstanding the pill had a restless night. Discharge from wound abundant; pulse 132, weak; no appetite; bowels open four times during the morning; cough less troublesome. Considerable morning perspirations. Percussion of the chest every where good. No râles could be detected any where. Respirations short; chest not fully expanded. Inferiorly and posteriorly the inspiratory murmur is harsh, and the expiratory murmur is prolonged over the whole chest. Vocal resonance clearer than usual on the right side. Heart's action fluttering. To have a dessert spoonful of wine every two hours. Rice pudding with one egg. At night a dessert spoonful of castor oil.

5th, 2 P. M. Passed a tolerable night. Has taken wine regularly. Vomited the castor oil last night. Bowels have been open twice this morning. At present she complains of the cough, which causes her much pain in the seat of the ligature. The discharge from wound is abundant; pulse 140, soft; tongue clean, respirations hurried. Continue wine.

9 P. M. Dr Alison was invited to meet Dr Bennett and Dr Spittal in consultation, and he saw the patient at this visit. Bowels open five times since the morning; stools loose and feculent, with streaks of mucus floating in them; pulse 130,

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* Dr Handyside at this period went into the country, leaving the farther surgical treatment of the case to Dr Struthers.

fuller. A thin purulent discharge squeezed from the wound. No tenderness of abdomen. To have one of the following pills every eight hours :—

℞. *Pulv. Opii* gr. i.; *Pulv. Plumb. Acet.* gr. ij.; *Pulv. Ipecac.* gr. ss. *Ft. pil.* Continue wine.

6th, 2 P. M. Has taken three lead and opium pills, which have checked the diarrhœa. Tongue clean; pulse 140, weak; morning perspirations. Omit pills.

9 P. M. Bowels have not been opened since taking the pills. Pain in the seat of ligature always induced on coughing. Pressure in the left iliac region causes pus to exude plentifully. Edge of the opening is somewhat wider, and the skin surrounding it is the seat of an erythematous blush, over a space the size of half a crown. Poultice to the wound. Continue wine. Meat soups, and nutritious diet.

7th, 2 P. M. Discharge from the wound this morning amounted to about two ounces. Pulse 140, soft; appetite improved; respiration hurried and thoracic.

9 P. M. On placing the trunk in a semi-erect posture pus flows freely from the wound without pressure. Pulse 130, very soft; feels weaker; bowels have been open three times during the day; stools natural, but soft. Skin covered with a damp sweat. Increase the wine to a tablespoonful every two hours. Repeat the *Pil. Opii c. Plumb.*

8th, 12 A. M. Bowels open once last night, and twice this morning. There is still cough, which is now followed by a tough expectoration. Occasional mucous râles are heard on inspiration over the posterior surface of chest. The inspiratory murmur, however, is generally harsh and dry; the expiration prolonged. Pulse 128, of greater strength. Discharge from wound less copious.

9th, 9 P. M. Since last report has been much the same. Discharge from wound this evening copious and thicker, mixed with small portions of slough.

10th, 2 P. M. On tightening the ligature, which is still firmly attached, about three ounces of thick greenish offensive pus flowed from the opening. On examining chest, a crepitating râle is heard for the first time about the middle third of left back, and inferiorly, sonorous râle, both with inspiration and expiration. Over the right back the respiratory murmurs are generally harsh, with increased vocal resonance, but no râle. Sputa are tenacious and slightly tinged of a rusty colour. To lie on the face as much as possible. To take a table spoonful every four or five hours of the following mixture :—

℞. *Mucilag.* ℥i.; *Syr. Simp. Vin. Ipecac., aa.* ℥ss.; *Sol. Mur. Morph.* ʒij.; *Aq. font.* ℥. *M.*

9 P. M. The report of this evening visit is in the words of Dr Struthers. Dr Bennett was not present. " For the last three

days the ligature has been pulled regularly at each dressing, with the view of at least accelerating its separation, but it has always firmly resisted the attempts at extraction. To-night, however, it suddenly yielded, when it was being firmly and steadily pulled at. The patient cried out that some one had struck her a severe blow on the belly, and she experienced considerable pain for a short time afterwards. The ligature was then entirely removed, having the same appearance as to loops and ends as the last one. No slough came with or after the ligature, but in the pus which preceded it were seen numerous flakes of dead tissue. Not a drop of blood followed the extraction of the ligature, neither was the latter itself tinged with it. Considerable pressure was made by pads over the iliac fossa and the umbilical region, so as to direct the pus towards the external opening. A little more force was used to bring away the ligature than is usually had recourse to in surgical practice; but it was thought to be very desirable that the ligature should come away, as the great discharge and irritation to which its presence apparently gave rise were evidently reducing the strength of the patient." This is the thirty-sixth day from the operation.

11th. 2 P. M. Amount of discharge from wound increased, amounting this morning to four ounces, of fœtid odour, mixed with shreds. Pulse 130, fuller; tongue clean; appetite improved; thirst less; bowels open once. Wine to be diminished to two drachms every two hours; omit lead and opium pills.

℞ *Opii* gr. i.; *Acid. Gallici* gr. ij. *Ft. pil.* One to be taken every eight hours.

℞ *Acid. Sulph. Dil.* ʒij.; *Tr. Digit.* ʒiij.; *Sol. Mur. Morph.* ʒij.; *Aq. font.* ℥xvj. A tablespoonful every three hours.

12th. 2 P. M. No material change. Bowels open once.

13th. 2 P. M. Cough has been very troublesome this morning; respirations still rapid and thoracic; expectoration tenacious, and slightly tinged with blood of a rusty colour. In right side of chest posteriorly, a distinct crepitating râle may be heard with the inspiration, and short sonorous rales with the expiration. Skin hot; pulse 140; tongue clean; bowels open once. Says that she is constantly hungry.

14th. 2 P. M. Much the same. No blood in sputa.

15th. 9 P. M. Less cough; pulse 120; bowels open twice; respiration still frequent and catching; no dulness on percussion could be determined. On left back, near spinal column in the middle third of chest, there is a space about the size of the hand, where both respiratory murmurs are harsh and exaggerated, with the vocal resonance of a shrill character. Crepitating rale has disappeared.

A blister to be applied to the left side early in the morning.

Oct. 20th. 2 P. M. Since last report there has been a marked improvement in all the symptoms. The blister rose well, and the cough and respiration have been easier. Mixture was not given. About one ounce of pus is discharged at each dressing. She has been eating animal food with appetite, and sitting up for an hour and a half daily. Last night she complained of severe tormina, increased on going to stool, and took one of the gallic acid and hyoscyamus pills. To-day the pain is still present occasionally. No tenderness on pressing abdomen. Bowels open three times last night and this morning. Blister nearly well.

To have a gallic acid and opium pill.

21st. 2 P. M. Has been taking vinegar and water three times a day for a few days.* With the exception of occasional tormina, doing well. Omit vinegar and water.

27th. Has had no tormina, and has been doing well since last report. To-day she was removed to another lodging in a carriage, under the care of Mr Crabbe, and bore the journey remarkably well.

28th,† 9 A.M. Expression of countenance much improved. Passed a tolerable night; had slight cough during the night, with no expectoration; chest examined with great care; respiration audible over the whole of the back, but more obscure on the right side inferiorly than on the left. Under the inferior angle of left scapula, over a space about the size of the palm of the hand, there was a distinct crepitating râle, loudest with inspiration. The vocal resonance here is also increased in intensity, but less so than formerly; and there is marked dulness on percussion. Anteriorly, bronchial respiration diminished. The inspiratory murmur is unusually harsh, but there are no anormal râles. Pulse 114; in other respects well. The wound discharges freely.

29th, 11 A. M. Passed a good night; discharge from wound slight; pulse 108; bowels open twice since yesterday. Absence of respiration over right back inferiorly, as high as lower angle of scapula; vocal resonance not increased; crepitating râle in left back diminished; little cough, very scanty expectoration.

> ℞ *Pulv. Digit.* gr. i.; *Sulph Quininæ*, gr. iss. *M. Ft. pil. Sumat* ii. *in die. Applicet. Emp. Lyttæ lateri sinistro* 2½ P. M.

30th, 11 A. M. Night somewhat restless, having experienced griping pains in the abdomen; bowels open at 9 this morning, since which the pains have diminished; tongue clean; blister was applied yesterday, but did not rise well; has no cough or expectoration; takes a breath without difficulty; respirations 36 in the minute. On sitting up, matter flows freely from wound.

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* This had been given probably with the best intentions, but without the knowledge of the medical attendants, by a pupil who was assisting at the dressings.

† From this period the case was treated in consultation by Drs Alison, Spittal, Bennett, and by Mr Crabbe, whose attention throughout the case was most assiduous.

On pressing abdomen, an indurated, undefined swelling is felt beneath integuments immediately to the left and below the umbilicus. On pressure over the induration, the flow of matter is accelerated. About half an ounce of thick good matter discharged this morning. No tenderness; but feels slight pain on pressing deep.

November 1, 11 A. M. Has been doing well. At present feels easy; pulse 106, soft; tongue clean; respirations 26; on cough or expectoration. About two teaspoonfuls of good pus sponged from wound.

4½ P. M. About 1 o'clock, feeling excessively hungry, she took half a teacupful of arrow root, a small piece of roast beef, half a pint of strong soup, and a small piece of bread, without the nurse being aware of it. Immediately afterwards she experienced severe griping pains over the whole abdomen, followed by vomiting of the matters taken. She was seen by Mr Crabbe, who administered a few drops of the *Ol. menth. pip.*, which produced some relief, and ordered warm fomentations to the abdomen. After vomiting the pulse sunk to 80. At present the griping pains occur frequently with loud borborygmi. Abdomen somewhat distended, and generally tympanitic above the umbilicus. A curve of intestine is very prominent, and clear on percussion. Continued firm pressure on abdomen gives relief. Frequent vomiting of a greenish fluid. Pulse 100, soft. Cries for relief.

Dr Spittal, who was sent for at this time, administered five grains of opium, in the form of suppository.

2d, 12 M. Pain in abdomen only occasional. Had a good night. Still occasional sickness, bringing up a few mouthfuls of mucus. Tongue clean. An injection was given at 10 A. M., which has not yet come away. Pulse 98, soft. Injection to be repeated, with a little salt in it.

To have beef-tea and toast for dinner.

8 P. M. There has been no stool since 6 P. M. on the 31st. During the day there has been frequent retching, with discharge of mouthfuls of mucus. The coil of intestine noticed in the report of yesterday still prominent in abdomen, and tympanitic. Marked difference between fulness and distension above umbilicus, and flatness and collapse of abdomen below it. Pressure with points of fingers causes pain; but she is very irritable. Has had two injections, which have been for the most part retained, but no evacuation has been produced. Had nothing to eat; drank only a little coffee. Pulse 108; no shivering. Fomentations to abdomen.

> ℞. *Calomel.* gr. viij.; *Gum. Opii* gr. ij.; *Con.* q. s. *Ft. pil.* ij. *Sumat una stat. sumend.*

Four pounds of warm water to be injected slowly. If no motion by 12 o'clock to have a tobacco enema; six ounces of boiling water to fifteen grains of tobacco.

11 P. M. Injection of water was given about a-quarter of an hour

ago, and returned immediately, with much flatus and some small pieces of feculent matter. Uneasiness in abdomen has been relieved since. Had one of the calomel pills at 9 P. M. Pulse 100, of pretty good strength. Tobacco enema not given. Repeat the injection at 1 A. M., and again at 3 A. M., if bowels are not moved. Repeat calomel pills at 2 A. M. if requisite.

3d, 8 A. M. Slept occasionally during the night, and vomited twice. About 3 A. M. was very restless, threatening to get out of bed. Two injections have been given, also another pill, but no fæces have passed. At present countenance anxious; and pulse 120, smaller; tongue furred; great thirst; no appetite; still distension of upper part of abdomen, especially the knuckle of intestine formerly mentioned. There is slight tenderness on pressure.

Twelve leeches to be applied to the abdomen. Tobacco injection.

11 A. M.* The whole of tobacco injection, as formerly ordered, was not given. It was kept in ten minutes; produced considerable collapse, with tremors and vomiting. Pulse now 120, small; great thirst; swelling of abdomen somewhat diminished, and knuckle of intestine shifted higher up; no tenderness. Turpentine embrocation to abdomen. Large warm water injection.

℞. *Acid. Hydrocyan.* gtt. xii.; *Aquæ* ℥iv.; *M.* ℥ss. every two hours.

8 P. M. Mixture has been given regularly, but always vomited shortly after. Some matters vomited immediately before this visit have a distinctly feculent odour. Two large injections have been given, which have been returned without fæces. Expression of countenance flushed and febrile. Thirst continues; pulse 140, of good strength. Still tympanitic swelling of upper part of abdomen, but more diffused; the knuckles of intestine prominent. She is occasionally seized with spasmodic pains of abdomen, and then the knuckles of intestine become very prominent and tense. Slight discharge from wound. Dr Handyside passed a probe a short distance into the sinus, which brought away a little blood. Apply eight leeches to the abdomen, to be followed by warm fomentations.

℞. *Gum. Opii* gr. iss.; *Calomel.* gr. iij. *Ft. pil.* Injection with ℥j. of tincture of assafœtida.

4th, 8 A. M. Passed a restless night; rather quiet about 5 A. M. Vomited frequently till about 4 A. M. Leeches bled well. Complained last night for the first time of throbbing pain in the calf of left leg, and swelling of foot and ankle. To-day the whole limb is swollen as high as the groin, and a slight degree of induration is felt in the course of the femoral vein. Pulse 120, soft, and rather smaller; vomited little since 5 A. M; matter ejected during the night more feculent; bowels not opened; tongue furred; thirst great. It was agreed to apply the electro-magnetic aura to the abdomen, which was done by Dr Handyside. Immediately after, she vomited about a pint of thickish brown-yellow matter of feculent odour. Pills and injections have been given as directed; fomentations continued.

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* Dr Handyside was now again invited to meet the other practitioners in attendance, as it appeared to them doubtful whether any part of these abdominal symptoms depended on the state of the wounds.

To continue the pills every four hours. Flannel roller to be applied to abdomen. Sugar of lead solution, with opium, to left lower extremity to be applied hot.

5 P. M. Has taken two pills since last report. Vomited occasionally, the matter being stercoraceous; leg less painful and less tense; no pain in abdomen, except on sudden and deep pressure; pulse 140; tongue slightly furred; thirst diminished. Has taken at various times a little coffee, milk, and biscuit, which, however, for the most part were vomited.

To continue pills. An injection at 9.

10½ P. M. Pulse 140, small, and soft. Has vomited three times since last report; matter vomited small; less feculent; abdomen softer and less swollen; no pain except on considerable pressure; no stool; flannel roller has been applied since 5 P. M.; countenance anxious; cheeks somewhat flushed. An injection immediately, to be repeated at 4 A. M.

One pill now, and another at 5 A. M.

5th, 8 A. M. Has passed a quiet night, having slept a good deal. Has taken two pills and two injections, the latter having been returned without feculent matter. At 12 M. had a little wine, as she felt faint. At 3 A. M. took a small cup of coffee and a portion of rice biscuit, which were retained; no vomiting since 10 last night; pulse varies from 126 to 135, easily excitable, small, and soft; tongue furred; still thirsty, but less so since 3 A. M.; pain of limb less; abdomen less distended and bears pressure better.

℞ *Calomel.* gr. iij.; *Opii* gr. ss. *Ft. pil.* 1 *quartis horis.* An injection some time during the day. A desert spoonful of wine every four hours. Fomentations to limb to be continued.

10 P. M. Vomited a little about 10 A. M.; again at 4 P. M. Matter not feculent. Has taken from time to time a little coffee, with bread. Wine taken returns, and apparently produces "heartburn." Has had two pills since morning. No complaint of pain. Is generally in a drowsy state, but easily roused. Upper, anterior, and lateral part of thigh more swollen. There is also a deep redness over a portion of the skin. Discharge from wound rather increased. She is thinner, and when she lies on the left side, matter from the wound flows over the left groin, occasioning erythematous redness. Had an injection of warm water at 3 P. M.,

returned without fæces; pulse 130, as before; abdomen tense and not so much swollen; loud borborygmi, heard at some distance from the bed. The stethoscope enabled amphoric resonance to be detected occasionally with these. To lie if possible on right side.

6th, 8 A. M. Between 10 and 11 last night had a warm water injection, which was returned in a few minutes without feculent matter. About 11 had a small beef-tea injection with forty drops of laudanum, which was retained. Had a pill at 11 P. M., and again at 4 A.M. Vomited at 2 and 7½ A. M.; matters ejected not feculent, but containing bile; abdomen less distended since last night, soft, and little or no pain on pressure; respirations decidedly show descent of diaphragm. There is still general enlargement of the limb, with an erythematic blush, extending from orifice of wound round to left hip, showing the surface over which the matter flows. She still lies constantly on the left side. Discharge scanty. Pulse 130, small. Thirst increased.

℞ *Ext. Colocynth.* gr. iv.; *Pulv. Scammon.* gr. iv.; *Ext. Hyoscyam.* gr. ij. *Ft. pil.* ij. s. s.

12½ P. M. Lies a little on right side. Has slept at intervals during the morning, and taken a little coffee and bread, which has remained on the stomach. Complains of griping pains through the bowels. The aperient pills were retained.

8 P. M. About 2 P. M. had desire to go to stool. Nothing was passed, however, but felt sick and vomited a mouthful of matter, not stercoraceous. About 7. P. M. vomited half a basonful of dark-brown matter, decidedly feculent. At present pulse 140, of good strength. Tympanitic distension of abdomen disappeared; still loud on percussion, however, which is well contrasted with the perfect dulness below umbilicus; otherwise the same; no tenderness on pressure; swelling of leg and erythematous blush very much diminished.

Continue calomel and opium pills. To have beef-tea injection early to-morrow. One drachm of mercurial ointment to be rubbed into the axilla on both sides.

7th, 8 A. M. Vomited only once last night; matter bilious, not feculent; slept well; swelling of leg diminished; pulse 138, soft; otherwise the same.

Pills to be continued.

8 P. M. Had a beef-tea injection at about 10 o'clock, which was retained. Half an hour afterwards felt a desire to go to stool, but was unable to pass anything; then took the opium and calomel pill. About 11 had a teaspoonful of Dalby's carminative, which immediately induced vomiting. After this she felt very faint and exhausted. Three teaspoonfuls of sherry wine were then given in water. At mid-day a tablespoonful of yellowish fluid of feculent odour passed *per anum*. From this time till 5 P. M. small quantities of similar fluid, sometimes thick as cream, passed from the bowels, accompanied by considerable griping

pains in the abdomen. At 5 an injection of warm water was given, which was immediately returned with small lumps of feculent matter. She has since had two fluid feculent stools. Pulse 130, full; tongue clean, but dry; general appearance much improved; hungry.

℞ *Ext. Hyoscyam.* gr. x. s. s.; *Pil. Opii, si opus sit.*

To have coffee and bread, and in the night, arrow root.

8th, 11 A. M. Had short snatches of sleep during the night. There were, however, considerable griping pains in the abdomen. Since last report the bowels have been open twice, and loose feculent matter passed on both occasions, with small hardened portions of fæces. At present is suffering much from colic pains. The coils of intestine distended with gas, produce visible prominences on the surface of the abdomen. There are none of these, however, below the umbilicus. A small indurated mass may be felt, on the left of, and somewhat below umbilicus; matter discharged from opening more copious and of offensive odour; distension of leg gone, slight swelling of foot only remains; erythematous redness of left groin nearly disappeared; tongue slightly furred, rather dry; thirst; pulse 140, firm; appearance of exhaustion much less. Had a little coffee, bread, and a tablespoonful of wine during the night. An injection immediately.

℞ *Pulv. Opii*, gr. iss.; *T. Rhei*, gr. x.; *Syr. q. s. Ft. pil.* iv. Two for a dose. Hot fomentations to abdomen.

8 P. M. During the day had two stools, with small lumps of fæces. There have been tormina throughout the day, but less than formerly. To-night the upper part of abdomen is found still to be distended with air; pulse 144, firm; tongue furred and dry; thirst. Has had no nourishment, with the exception of a little coffee, which was again vomited. Skin hot, feverish.

To have draughts with ʒj. *Kali. Citratis et Vin. Antim.* gut. x. Draught at night, with *Sol. Morph. m.* xxv. Milk and water for drink.

Nov. 9th. 11 A. M. Passed a tolerable night; likes the effervescent draughts; vomited twice a slight quantity; is greatly exhausted and emaciated; tongue moist; less thirst; pulse 140, smaller. About two tablespoonfuls of soft feculent matter passed *per anum;* fever less.

*Pil. Opii et Calomel.* i. Milk and water for drink. Two teaspoonfuls of wine occasionally.

8 P. M. Has taken beef-tea and milk and water several times, but they have either been immediately vomited or retained a very short time. Between 1 and 4 P. M. had two stools, soft, but containing lumps of purulent matter and a little mucus. To-night pulse 140, thready; countenance anxious; eyeballs staring; ema-

ciation extreme. Has a sore on the left hip, the surface broken over the space of a five-shilling piece. Had one opium and calomel pill. Gums and mouth sore; spirits depressed, and expresses a fear of approaching death.

Beef-tea injection, with *Sol. Morph.* ʒj.; *Haust. c. Sol. Mur. Morph. M.* xxv. White-wine whey.

Nov. 10th, 8 A. M. Vomited much last night until 11 P. M. after which passed rather a restless night, with occasional sound sleep for short periods; pulse 150, small and more feeble. Had two drachms of wine six times during the night, and several times a little beef-tea. This morning had a wineglassful of milk. Complains of mouth being hot and sore; countenance less anxious. Beef-tea injection was retained some time, and when passed was accompanied with much flatus. Sinapism was applied to epigastrium last night, but produced no relief. The upper part of the abdomen still distended. There are occasional tormina, preceded by loud borborygmi. Discharge from opening thin, fœtid, and tinging the bed-clothes blackish.

Repeat beef-tea injection with forty minims of solution of muriate of morphia; wine as before; beef-tea or milk for drink.

8 P. M. Passed the day tranquilly, with only occasional pain in abdomen. Appetite improved, asks for food; has taken four ounces of milk twice, and sometimes a few tablespoonfuls of beef-tea with a little bread. Two teaspoonfuls of wine have been given every hour; no vomiting. At present is tolerably easy; anxiety of countenance disappeared; voice more firm; pulse 130, firm; no motion; somewhat stronger. A beef-tea injection with forty minims of tincture of opium has been given and retained.

*Lin. Sapon. c. Opio*, to be rubbed on abdomen. *Haust. Anody.*

11th, 8 A. M. Passed a restless night from griping pains in abdomen and flatulency; vomited twice during the night; pulse 136; thirst; no stool; frictions on abdomen have produced no relief. Warm water injection.

8 P. M. During the day has vomited every thing taken; matters ejected are of a greenish hue, with flakes of mucus; bowels open slightly once, when about two ounces of feculent matter were discharged with several lumps in it; frequent desire at stool and tenesmus. At present pulse 140, of good strength; upper part of abdomen still distended and tympanitic.

℞ *Bismuth. Oxyd.* gr. x.; *Pulv. Opii* gr. ii. *M. Ft. pil.* iv. One every hour.

12th, 8 A. M. About one o'clock this morning the tenesmus and pain in abdomen have ceased; she had then taken two pills; has since been restless and vomited every thing taken; thirst; mouth very sore, with discharge of saliva; bowels not opened since last report; pulse 130, firm.

℞ *Ext. Colocynth.* i.; *Scammon.* gr. ij.; *Ext. Hyoscyam.* gr. i.; *Pil. Opii* gr. ss.; *Bismuth.* gr. iij. *Ft. pil.* ij. To be taken in four hours if the bowels are not opened. Fomentations and warm water injection.

7 P. M. Has slept occasionally during the day. Still cōntinual vomiting of ingesta; has taken pills; no motion; abdominal pain and griping less severe; injection would not pass; pulse 126, weak; is very restless; hands and feet cold; countenance sunk; dark areola round the eyes. To have large warm water injection.

℞ *Pulv. Opii* gr. i.; *Bismuth.* gr. vj.; *in pil.* ij.

The warm water injection was given easily about 9, and was retained several minutes. When returned it brought away only one piece of feculent matter the size of a bean. Vomiting commenced shortly after. The coldness of extremities now increased. She complained of want of breath, *tinnitus aurium*, and frequently turned from side to side. Hot bottles were applied to the hands and feet, and they were also rubbed assiduously with warm flannels. Wine given freely, but was always vomited. Pulse small, weak, and thready. The pills were vomited. About 11 P. M. the restlessness was somewhat abated, and she expressed a desire to go to sleep. After lying some time, she requested the nurse to raise her up. This was done, when she fell back and expired, without a groan or struggle, at ten minutes after 12 o'clock,—the 70th day after the operation.

*Examination of the body, November* 14*th*, 4 P. M. Present, Drs Alison, Simpson, Spittal, Cowan, A. D. Campbell, Handyside, Bennett, and Mr Crabbe.

The body was greatly emaciated.

The *head* was not opened.

*Chest.*—The cavity of the pleura on the left side contained about one ounce and on the right about two ounces of serum. On the left side the pleuræ were adherent so strongly, that the lung was lacerated in removing it: this more especially between the inferior surface of the lung and upper surface of the diaphragm. On the right side the pleuræ were adherent at the apex, and over inferior lobe, but the adhesions were easily torn through.

The anterior margin of the upper lobe of the *left lung* was emphysematous; its posterior portion slightly engorged. On section it crepitated readily, and was healthy in structure. The inferior lobe felt dense externally, and on section the parenchyma was of a brownish red colour; splenified; easily breaking down under the finger, and portions of it placed in water sunk nearly to the bottom of the vessel. The two upper lobes of the *right lung* very emphysematous anteriorly, engorged posteriorly and inferiorly, but otherwise healthy. The anterior half of the inferior lobe also emphysematous, with here and there indurated patches of chronic lobular pneumonia. The posterior half of this lobe was splenified throughout, as in the opposite lung. The lining membrane of the bronchi was healthy, here and there covered with mucus. Both lungs were small in volume.

The *heart* was small and pale. Its right cavities contained a firm dark coagulum. The valves and structure of the organ healthy. In the aorta there was a small but firm coagulum, partly decolorized.

*Abdomen.*—On reflecting the walls of the abdomen, a few chronic bands of lymph were torn through, uniting the opposite portions of peritoneum. The line of incision was firmly united except at its lower end, where a round opening existed about the size of a pea. On the peritoneal surface the union was marked by a dark blackish line, which was perfectly smooth and free from lymph. The omentum was thin and transparent, destitute of fat, and stretched tightly over the intestines. Its inferior margin adhered strongly to the visceral and parietal peritoneum, about an inch above the pubic bones. The omentum was cut through transversely about its middle, and the intestines below exposed, which were greatly distended with gas. These were found to be portions of the ileum, the coils of which were more or less adherent to each other, to the mesentery, omentum, and to the neighbouring organs by bands of chronic lymph. The adhesions were now carefully torn through, the gut liberated and traced downwards. Exactly five feet and a half from the cæcum, above and to the left of the umbilicus, the intestine was constricted by a band of lymph, as if a ligature had been tied round it. Above the constriction the gut was distended to about the size of the wrist; below, it was collapsed to the size of the little finger. Air could be pressed from the superior portion into the inferior, but the passage of water poured from above was completely checked at the seat of stricture. All the intestines above the stricture were greatly distended with gas; those below it, including the cæcum, colon, and rectum, were small and collapsed.

The cavity of the pelvis was blocked up, and separated from the general cavity of the abdomen by firm adhesions between the surfaces of the abdominal walls, the omentum, and knuckles of intestine. The peritoneum in this place, and especially in the left iliac hollow, was covered with a dense layer of chronic lymph. This lymph was about one-eighth of an inch in thickness, of a dirty greenish colour, mixed with black pigmentary matter, of great hardness to the feel, and cut under the knife like cartilage. With some trouble the united knuckles of intestine, and portions of omentum involved were separated and drawn out. A cavity was thus exposed, about the size of an orange, situated between the uterus and rectum, lined throughout by the same dense, chronic lymph spoken of above. The anterior surface of the uterus was firmly united to the bladder by chronic adhesions. On the right side about one inch of the Fallopian tube and broad ligament remained, the extremities of which were closely united to the anterior wall of the cavity. On the left side the margins of the uterus and short pedicle of the broad ligament were so united to the walls of the cavity that they could not be separated. This cavity or pouch between the uterus and rectum communicated with the external opening, and was evidently the place where the pus during life had accumulated. A sinus opened into it superiorly, which on being traced upwards was seen to extend, above the descending colon, between the peritoneum and intestines as high as the diaphragm on the left side, where it terminated in a cul de sac, the size of a hen's egg. The sinus was about the size of the little finger, and lined throughout by the same dense, greenish lymph formerly noticed. The cul de sac was full of dirty-yellow offensive pus, and bounded by a portion of the stomach and left lobe of the liver internally; the diaphragm above and posteriorly; and the colon and spleen externally and inferiorly. It also was lined with dense chronic lymph.

The mucous membrane of the stomach and small intestines were healthy. The latter contained a clayey coloured soft feculent matter. The large intestines were empty. No appearance of inflammation existed at the constricted part. The internal surface of the rectum, extending seven inches from the anus, was intensely vascular, thickened, and inflamed. Six ulcers, varying in size from a sixpence to that of a shilling, were scattered over the diseased part of the gut, one of the largest being only an inch from its extremity. They were round in shape, and covered with a raised dirty greenish slough.

The *liver*, *kidneys*, and *spleen* were anemic, but healthy in structure.

The *femoral* and *saphena veins* could be felt hard and distended below the integuments. On dissection, these, as well as the external *iliac vein*, up to the point where it passed under the layer of lymph, in the left iliac hollow formerly described, were found to be obstructed by a coagulum of blood. This coagulum was adherent to the internal wall of the vessel, was partially decolorized, and of the consistence of soft cheese. This obstruction of the vessels ceased about three inches below Poupart's ligament.

### *Description of the tumours removed.*

The tumour which involved the left ovary on being removed weighed nine pounds and a half. It was of an oval form, and measured thirteen inches in its longest, and nine inches and a half in its shortest diameter. Its envelope was composed of white, dense, and glistening fibrous tissue, having upon its external surface patches of various sizes, resembling chronic lymph. On its anterior surface might be seen openings, or ulcerations, varying in size.

The edges of these ulcerations were smooth and rounded, and of the same thickness as the fibrous envelope. The cut surface, which had been near the ligature, now presented a large opening into the tumour, through which numerous cysts, varying in size from a pea to that of a billiard ball, protruded. The incision into it, made during the operation, had opened up one of these cysts about the size of a cocoa nut.

Dr Bennett and Dr Handyside sent the tumour to the University Museum, where Mr Goodsir was forming a collection of these growths. By him it was minutely injected, and afterwards cut up, in order to show its internal structure. In dividing it, some of the internal cysts were found to be full of pus, whilst others contained the usual glairy fluid, common to these tumours.

Three preparations were made from this tumour, which may be seen in the museum, and which demonstrate the following facts.

1*st.* A portion of the fibrous sac, showing the attachment of numerous cysts varying in size and shape. A minute injection has been thrown into the arteries? and exhibits how richly the walls of the internal cysts are supplied with blood-vessels. One of these cysts, about the size of a small hen's egg, has its upper half fully injected, whilst the lower half is pale. The margin between the two is uneven but abrupt, and from the creamy and distended appearance of the cyst, there can be no doubt that it is full of pus.

*2d.* A portion of the fibrous sac, showing the incision which separated the tumour from its attachments. The opening is of an irregular form, about three inches in its longest diameter.

*3d.* A portion of the fibrous sac, showing the ulcerated openings formerly described.

The left ovary was about the size of a walnut. It was formed externally of a dense fibrous capsule, and internally of several small cysts. The natural stroma of the organ had entirely disappeared.

### REMARKS BY DR BENNETT.

The question I have frequently asked myself is, was I warranted in proposing and urging others to perform the operation? The reasons that induced me to do so were the following,

*1st*, The youth and good constitution of the patient.

*2dly*, The disease was rendering her life miserable, and she earnestly wished the operation to be performed.

*3dly*, Death seemed unavoidable at no distant period. At least, it could not be anticipated that five gallons of fluid could be removed from the abdomen every three weeks, for any length of time, whout injury to the vital powers.

*4thly*, Extirpation of the tumour appeared to be the only rational means of cure.

Again, on looking at the most recent statistics of the operation, published by Dr Atlee,* I found that abdominal section has been performed for ovarian tumours, real or supposed, 101 times. If we extract from this list cases where the operation was not completed, and those on the point of death before the operation was begun, we shall have ninety remaining, in all of which the tumour was excised. Of these sixty-two recovered and twenty-eight died: Thus, whatever may be thought of the correctness of the statistics, the broad fact still remains, that an ovarian tumour has been extracted from living women in sixty-two cases with perfect success. An acquaintance with the structure and mode of development of these growths must convince us that the only other possible mode of cure is by rupture of the cyst, and then only under particular circumstances. This I shall endeavour to how in a separate paper. At present it need only be said that this is an occurrence of extreme rarity, and yet, were we to be guided by the opinions of those surgeons who refuse to perform ovariotomy in any case, no other termination is to be expected, and the disease, notwithstanding the facts previously stated, is to be considered as irremediable by art. But every case must stand upon its own merits, and when all the circumstances of the one detailed are taken into consideration, the perfect diagnosis that was established, and the probability of a speedy fatal termination, (a probability afterwards rendered certain by the suppuration discovered to exist within the cysts), it must be granted that the operation, if admissible at all, was so in this instance.

An important practical question presents itself in regard to the treatment after the operation, on which there is a difference of opinion among the practitioners who witnessed the case and dissection, viz. how the cavity or pouch containing pus, between the uterus and rectum, and the sinus leading from it up to the diaphragm, were connected with the pressure made on the abdomen by the many-tailed bandages and compresses, in order to direct the matter towards the external opening. Some have thought, that the pressure employed, instead of directing the matter downwards, may have forced a portion of it upwards; while others are inclined to believe, that if the pressure, which latterly was much relaxed, had been more steadily continued, the formation of that cavity and sinus might have been prevented. The question is important, however, rather in reference to the proper treatment of future cases, than to the fatal event of this case; for the symptoms of ileus and the death of the patient were obviously dependent on the constriction of the portion of ileum above noticed by a band of lymph which was at the distance of some inches from any part of the wound, and had no connection either with the cavity or the sinus.

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* American Journ. of the Med. Sciences, April 1845.

Although various lesions were found after death, their origin and connection with each other will easily be understood from a perusal of the case, and of the *post mortem* examination.

Notwithstanding the unsuccessful termination of this case, I am still of opinion that ovariotomy is warrantable *when the diagnosis of the tumour is certain, and the other circumstances favourable.* The more frequently it is performed the more readily will experience dictate the avoidance of many errors that even now encumber the practice of it. When once recognised as a legitimate mode of treatment, and only performed in appropriate cases, there is every reason to hope, from the experience of the past, that the degree of mortality which has hitherto accompanied it will gradually diminish. Before such a result can be hoped for, however, it is necessary that our notions of the pathology and diagnosis of the disease should be improved. To these subjects I shall advert in a separate communication.

## REMARKS BY DR HANDYSIDE RELATIVE TO THE OPERATION OF OVARIOTOMY IN GENERAL.

In the divided state of opinion existing among surgeons, relative to the propriety of undertaking the operation of ovariotomy, the profession may naturally look to me as responsible for the step taken in the case now narrated; and expect a full statement of the reasons that led to the performance of that operation.

It is acknowledged, that the only justification and full warrant for such surgical operations as involve imminent peril and hazard, —(such as lithotomy, the ligature of a large artery, the operation for hernia, amputation through the thigh, ovariotomy, &c.,)—rest on this ground, that *their performance is essential to the preservation of the patient's life.* Thus, the patient in the present case had been much reduced by repeated tappings, the last three of which were found to be necessary during the very limited space of about three weeks; and this was not a case similar to those described by Martineau, Portal, and others, which "amply attest the protracted duration of life in association even with this stage of the affection." But there are other important conditions which must coexist with the above requirement in order to warrant the step of a capital operation, such as that of ovariotomy. These are, *secondly,—the establishing a clear diagnosis* in a proposed case of ovariotomy, so as to determine accurately that the tumour is not malignant or of solid consistence, that it presents no serious adhesions, and that the uterus is not involved. *Thirdly,—that there is no hope of a palliative cure, or of a spontaneous declension in the severity of the urgent symptoms. Fourthly,*—that *there is no co-existent disease* or condition of the system such as contra-indicates capital operations in general. *Fifthly,*—that the patient and her relatives, on being made acquainted with the danger attending the operation, express their urgent request for its performance. *Sixthly,*—as to the *statistics* of the operation, I refer to the *Edinburgh Medical and Surgical Journal* for April 1844, and to the *Monthly Journal of Medical Science* for February and May 1845; although these are *by no means unfavourable* as an argument for its performance, still I would not make use of them as such, for these reasons: First,—that many cases in which the operation had been most recklessly and unjustifiably performed are included in these tables, which have thus perverted the statistical results, and made the operation appear in a less favourable light; and, Secondly,—because surgical statistics in general stand broadly forth against the performance of many universally recognised capital operations, for instance, some of the larger amputations, &c.

I am no advocate for the operation in cases such as those in which it has been generally had recourse to. Like many other surgeons, I had been previously prejudiced against and averse from the operation, (which aversion was in no degree lessened by the circumstance, that some Edinburgh surgeons had previously refrained from undertaking the operation in the present case); but, after a careful examination of the subject, I was forced to the conclusion, that it is the duty of the surgeon, *in certain rare cases*, to recommend and to practise the operation, and the case submitted to my care appeared to be one of those. This view I adopted only after having been informed of the opinion of those of my professional brethren versant in obstetric diagnosis, who concluded along with myself, that the tumour was non-adherent throughout; —that it was attached only by an elongated pedicle, the broad ligament;—that the uterus and peritoneum generally were healthy; —and that the fluid in the abdomen was either the result of the irritation of the peritoneum from the presence of the tumour, or the produce of the tumour itself.

Such cases differ from those which generally come within the province of the surgeon, as, in arriving at a decision as to the propriety of the operation, he thus manifestly requires the co-operation of a skilful obstetrician, and hence a probable reason for the unfavourable reception that the operation had met with from the majority of operating surgeons—the tendency to which has been in no way lessened by the undeniable circumstance, that really little or no surgical skill is required for its accomplishment, and, consequently, that no credit for anatomical knowledge, or surgical dexterity, can accrue to the operator,—for in my opinion, the operation requires less of these qualifications than even the common operation of amputation through the leg.

I add that, while a diagnosis in most other cases requiring surgical operation can generally be at once and easily made by the surgeon himself,—much care, and repeated examination of the patient, are required in cases submitted to him for ovariotomy, as in the present case, in which he had not decided on the operation until he had made repeated examinations of the patient, both before and after, as well as during the last tapping. In this way a diagnosis was formed which has been amply verified, and which confirmed the original view taken by Dr Bennett.

Lastly, I must protest against the indiscriminate performance of the operation, and in such rare cases as the present, *but in such only*, I am quite ready to repeat it.

## ART. IV.—*On Hindu Midwifery.* By JOHN ROBERTON, Manchester.

MAY I request that this brief account of the sufferings and dangers attendant on child-bearing in the East be regarded by your readers as an appendix to my papers on the age of puberty in Hindu women? But for those papers, I should hardly perhaps have thought the present worthy of occupying by itself a place in your Journal.

A number of years ago I published, in the London Medical Gazette, a lecture with the title, "An Apology for the Study of Midwifery as a Science,"* meant chiefly to prove that it is an error, and a very gross one, to imagine that child-birth is generally safe and easy in countries where there is no obstetric science. Above all, that it is a mistake to suppose, as many do, that nature, in such circumstances, is left alone to complete her own work without being interfered with; the very reverse being true: that, in fact, a midwifery dangerously meddlesome is ever found in connection with a low stationary condition of society; and that it is only where obstetric science exists, that nature, in parturition, is allowed to have fair play; the more advanced the state of science, the simpler and more rational the practice, the less the interference. In other words, that rational simplicity as to the mode of practice (contrary to the ordinary opinion) is never found in a primitive, rude state of society, but is the latest and noblest effort of knowledge,—the last and most difficult stage of attainment.

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* Vol. xi. pages 38 and 71, A. D. 1833.

In the lecture referred to I illustrated my reasoning by a wide induction of particulars respecting parturition in most of the less civilized tribes and nations of the world, and presented a body of evidence to show the injurious results of a midwifery disconnected from science. With reference, however, to Hindustan, I was unsuccessful in discovering any facts that were to my purpose. All I met with in authors being in favour of the notion that parturition among the Hindus stood in no need of the aids of European humanity and skill. This was the more trying and disappointing, as a gentleman of this county, a member of a learned profession, had then recently published and very diligently circulated a pamphlet, in which he severely censures the practice of MAN-midwifery; drawing his strongest arguments against it from the assumed ease and safety of child-bearing in the East, where, as he supposes, no man finds admission to the lying-in chamber. It will be seen that I am now in possession of a body of facts, which compel to a widely different conclusion from that fancied by this zealous gentleman—which prove that Hindu midwifery, (I include under the title labour and the after-treatment), is destructive to life in a degree never paralleled, according to the information we possess, in any other quarter of the world, rude or refined.

It is not, of course, to revive a long-settled contest concerning the advantages or disadvantages of scientific midwifery that I have drawn up the following paper. *That* dispute may be left to the decision (silent perhaps, but not on that account less emphatic,) of the civilized world. All now are satisfied on this subject except a few scrupulous, eccentric persons, whose minds will remain shut to conviction either from facts or reasoning. My desire rather is, in pursuance of the object of my former papers with reference to the Hindus, to illustrate what is as yet very imperfectly understood in England—the social and domestic position of the female sex in that portion of our mighty empire. In truth, I am satisfied that, owing to the existence of caste, and the consequent refusal of the mass of the Hindus to admit Europeans into their dwellings, (excepting physicians in certain circumstances,) that we have never, from any sources, obtained much trustworthy information concerning what I would call *the domestic constitution* of a Hindu family. Hence the vague assumptions as to the influence of climate, not only in producing early puberty and early child-bearing, but also the safe and easy performance of the functions of child-bearing. I should not be wrong in asserting that, at the present moment, the following sentence, which I copy from the 8th edition of Dr Burns' Midwifery, expresses truly the conviction of the profession—of the public at all events—on the subject to which it refers. "In a state of natural simplicity, women in all climates bear their children easily and recover *speedily*, but this is more especially the case in those countries where heat conspires to relax the fibres." The facts I am to produce are not opposed to the notion that Hindu women, if treated on rational principles and with humanity, would have easy labour and safe recovery; but they go to show that, owing to the gross ignorance concerning parturition and the after-treatment, and the low estimation in which women are held, the mortality far surpasses anything which could have been imagined. On other authority than that of a most respectable and experienced Hindu physician, well versed in European knowledge, the facts in my possession would hardly have been deemed credible; nor even credible with this in their favour, were they not corroborated by the best collateral evidence. The facts will be found sustained by ample evidence; indeed, their correctness does not, I presume, admit of doubt or suspicion.

I will next speak of the documents from which my facts are extracted. In the course of last year a friend just returned from India lent me a tract he had brought with him, in which I noticed allusion to a sanitory inquiry that had been made into the condition of Calcutta, the results of which, it was stated, were printed in several folio volumes. Through this friend I endeavoured to obtain a copy of the report referred to from Calcutta. The attempt, however, did not succeed until application was made to a member of the Bengal Government, when I was so fortunate as to obtain a complete copy of the report and the various appendices. The report is a folio of about 300 pages, with copious appendices, amounting probably altogether to 1200 or 1500 pages; the production as a whole presenting a body of evidence concerning the topography of Calcutta and environs, the moral and physical condition of the natives, the state of the native dwellings, of the streets, of the water tanks, the sewering and drains, reports of hospitals and dispensaries, of the diseases and mortality in each thannah or division of the city, together with many other particulars bearing on the health and police of that great capital, illustrated with diagrams, coloured maps, &c.—forming, in fact, a sanitory report more minute and comprehensive than has ever been produced, I believe, in reference to any European town. It is from evidence delivered before a committee, of which the Bishop of Calcutta was chairman, that I am supplied with the different particulars regarding Hindu midwifery. The amount of evidence on the subject is not very lengthy, but amply sufficient for my purpose.[*]

The chief witness concerning the dangers of child-bearing in the Hindu is Modusoodun Gupta,—the gentleman from whom I received so large a portion of the facts contained in one of my papers on the Period of Puberty in the Hindus: at the present time I believe he is demonstrator of anatomy in the Medical College of Calcutta. At the period when he furnished the evidence I am referring to, viz. in 1837, he gave to the committee the following interesting account of himself, which, together with his evidence, I condense somewhat from his answers.

"I have practised medicine in Calcutta for twelve years among the native population. I was educated in the Sanscrit and English College for six years, where I afterwards became professor of Sanscrit medicine. Before I entered the college, I had been taught the native system of medicine under Kableeram Kobeeraze, a learned native doctor, under whose instructions I also visited patients in the villages. During my studies at the Sanscrit College I attended for five years the lectures of Dr Tytler and Dr Grant upon anatomy and the theory and practice of medicine and surgery. In the two latter years of the period I was their assistant, it being my business to explain to the students (who were all natives) the English terms in Sanscrit and Bengalee. It is now two years since I left the college, and at present I am pundit of the Medical College, where I assist the professors, Drs Goodeve and O'Shaughnessy, in explaining to the students the branches which have formed the subject of their prelections. After lecture is over, I explain the name of the diseases in Bengalee, and the qualities of native medicines according to my experience. As a practitioner of medicine, my experience has been obtained among the respectable, the middle, and the poorer classes of natives; most among the middle classes. I have seen a great deal of the diseases of the lower classes in every part of the native town; very little in the suburbs; but I receive every day statements of the diseases and treatment of the natives in the villages from the native doctors. Moreover, two or three times in a month I go to my native village, Baydaypatty, about sixteen miles from Calcutta, and stay two or three days or a week, and when there I practise among the native inhabitants.

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[*] The title of the document is "Report of the Committee appointed by the Right Honourable the Governor of Bengal for the Establishment of a Fever Hospital, and for inquiring into Local Management and Taxation in Calcutta. Calcutta, Bishop's College Press, 1839." The evidence on which this Report is founded, viz. examinations of a great number of persons,—judges, physicians, magistrates, military officers, and engineers, together with evidence presented to the committee in a written form, fills six volumes of appendices. I have reason for believing that these documents have never before reached England; I have conversed with no one who has even heard of them.

"I visit women as well as men, Hindoo women, few Mussulmen, and still fewer Mussulman women. Mussulmans, however, are attended by Hindu physicians, as well as by those of their own religion; they have no objection to be so. My grandfather was family physician to the Nowab at Hoogley.

"Allow me to say," Modusoodun Gupta continues, "in answer to a series of questions, "that the Hindoo women are not so subject to any of the diseases I have mentioned (alluding to evidence formerly given) as the men. They are liable, though less so than the other sex, to remittent and intermittent fevers and their consequences, diarrhœa, dysentery, and dyspepsia. To hysteria and irregularities of the catamenia they are very liable.

"Native women suffer much pain in parturition, chiefly from the youth of the mother; but it is very rarely attended with danger to the life of the latter, unless there be some accident, as a premature or a cross birth, or unless fever ensues after the birth. Unhappily fever in such circumstances is of frequent occurrence, for in two, three, four, or five days the woman is generally seized with it: the symptoms being pain in the belly, sweating, headach and giddiness, and inflammatory fever. Without proper treatment the issue is often fatal. In cases of this nature I am frequently called; and in my opinion the disease could generally be prevented if the women were attended from the beginning by midwives of proper skill. Those who do attend are perfectly ignorant of their profession. It is but fair, however, to say, that though the danger of a seizure of fever is partly to be ascribed to their ignorance, perhaps as much blame rests with the native customs.

"The woman after delivery is placed in a small damp room, very ill ventilated, with one small door only, and no window or opening of the nature of a chimney. This apartment is a temporary hut of mats and bamboo, thatched with straw or grass, in a corner of the compound detached from the dwelling-house, (the woman during such period being considered impure,) and is generally kept for the sole purpose of the woman of the family being delivered in it. This remark applies even to wealthy natives who have substantial houses for dwelling in, except a few who do not observe the custom. From the moment after delivery, the doors being closed, wood fires are kindled in different parts of the room, sometimes two, sometimes three, the smoke of which is allowed to find its way through the walls and roof. Thus the room is kept at a great heat: it cannot, I think, be below 90° Fahrenheit.

"During the first three days they give the woman a powder made of stimulating spices, as black pepper, long pepper, and dry ginger; at the end of which period she begins to take the same ingredients made into a paste by means of hot water. It is the invariable custom to give this powder and paste whatever the state of the mother's health may be; although in many instances it is extremely prejudicial, and in others dangerous to life. This may be judged of when I state that *three* or *four* women out of *twenty* die of fever and tetanus produced by this treatment in six, eight, or ten days after parturition. With regard to medical aid, the doctor is never called in unless the woman is apparently in danger, and the prejudices in favour of these customs are so great among the Hindus, that a medical man would find it very difficult to prevent their being followed. Such prejudices among the bulk of the people, are, I think, as strong as ever, though there are some families which are an exception; the number is very few."

Concerning this astounding and almost incredible announcement of the Baboo's, that three or four out of twenty women die in childbed, (elsewhere he states the numbers as "four or five" out of twenty,) before quoting further from his examination, it may be well to see how far he is borne out by other evidence. That he is really sustained in this his deplorable amount, it will be seen there is no room to doubt. Thus Dr J. R. Martin, one of the most intelligent and experienced of European physicians, in answer to a question, says, "I have perused the evidence of Mudosoodun on the second examination. I have had many opportunities of knowing that what he says *is true.* I have never yet been able to enter the apartment of a lying-in woman, even in the houses of the wealthier Baboos, on account of the heat and suffocating smoke, until it has been thrown open and ventilated. I have reason also to know, that in the treatment of the native midwives, they are in the habit of hurrying the operations of nature, so as greatly to injure their unfortunate patients. The treatment altogether of lying-in women is pernicious; and my surprise is, that the mortality is not even greater; *few European women could survive it.* I am not so well acquainted with the effects of their management on the new-born children, as the cases I have been called into were to save the lives of the mothers."

Again, to the same effect writes Dr Duncan Stewart, in a very instructive document delivered in to the Committee, entitled, "Notes on the Medical Statistics and Topography of Calcutta."

"Of native customs injurious to health, their treatment of parturient women and their infants occurs most forcibly to me. Labour is generally conducted in the erect posture, and is not considered complete till the expulsion of the placenta, which is effected by force, the quicker the better, and often followed by a dreadful hemorrhage. *La nouvelle accoucheé* is immediately subjected, with closed doors, to a fumigation of pyroligneous acid, from the combustion in her chamber of green wood. Puerperal fever, tetanus, and other diseases, are frequent and fatal. The infant they never wash until the following day, and after it has been well spread out and dried in the sun."

Such is the clear and pointed testimony of two experienced English physicians, in confirmation of the Baboo Mudosoodun Gupta's account of the dangers of Hindu women in childbed. The remaining portion of his evidence, as far as it relates to midwifery and the fate of the infant, is as follows. It has reference chiefly to the state, (or rather *absence*,) of midwifery knowledge.

"The customs I have mentioned are not connected, in the opinions of the people, with any religious precept or observances, except the having an apartment for women during childbirth detached from the house. The apartment in question might be as airy and well built, and spacious and cool as might be thought desirable. Religious opinion has nothing to do with any of these matters. But all women, except Braminee, remain impure for a month; Braminee women only for twenty-one days.

"If we had a sufficient number of well-qualified Hindu midwives, whose charges were very moderate, I think they might accomplish a great deal by good advice. If they were seen to succeed to the extent of reducing the number of deaths from four or five out of twenty to one or two, there is no doubt they would be applied to by the natives for advice, and would follow it; from my experience and what I know of the natives, I have no doubt at all of this. If an hospital with a lying-in ward were established, with proper Hindu midwives and attendants, a great number of married women of the inferior castes would be happy to avail themselves of it; by which means many lives would be saved. Moreover, such an hospital, united to a class in which native Hindu women might be instructed by an European professor of midwifery, well acquainted with the vernacular language, would be attended with extensive beneficial effects. The midwives so instructed would readily find employment, at a moderate charge, among Hindu women of all castes and ranks, at their own houses; by which, I am well assured, many of their lives and those of their children would be saved.

" Neither the Hindu women nor their families have at present any objection to their being attended by an European doctor, except on the score of expense. But the misfortune is, that there is no security that what he prescribes is administered. Educated Hindu midwives would remove this difficulty. They would remain in attendance on the lying-in woman,—would see the prescription carried into effect,—would keep up the courage of the patients,—and in a word, prevent, to a great degree, the injurious treatment and practices to which they are now subjected.

" The prejudice which formerly existed against vaccination in Calcutta has almost entirely subsided since the establishment of native vaccinators. The Brahmins, about twenty years ago, in Lord Minto's time, who used to go about performing inoculation for small-pox, are now hardly ever seen. In like manner, I have no doubt that if midwives were educated, and supported in the manner above-mentioned, so as to be able to attend at native houses for small fees, the result in extirpating the present mischievous system in the treatment of lying-in women would be attended with analogous success.

" Children from the time of their birth are subjected to great danger from the circumstances to which they are exposed, as above-mentioned, in common with their mothers, except that they are not drugged with spices. They are kept in the same apartment; the child is also impure for the same time.

" The heat and confined air produces irritation in the constitution of the child, and fever and tetanus. The treatment of the mother has very bad effects upon her milk, and this also disorders the child. There are not many children who die from these circumstances, but it injures the constitution materially. I know that the children of the Hindu inhabitants of Bengal are generally weakly, and that they are subject to several diseases, hooping cough, (which I consider in this country not an infectious disease,) dyspepsia, diarrhœa, dysentery, and all the fevers before-mentioned. I do not see in the town of Calcutta any children that are in perfect health."

These surprising and affecting details are corroborated by an immense mass of evidence in regard to the social condition, the diseases and the mortality of the native inhabitants of Calcutta, which it would be foreign to my purpose at present to produce. They seem to justify the caustic observation of Dr Duncan Stewart in his " Notes" before referred to, that " women, infants, and children, appear to suffer most from the effects of the climate and privations. Unhappily the degrading religion of the Hindu inculcates no better moral than fatalism, and considers females and infants, (except the first-born,) as objects of inferior consideration to a cow."

The above statements, exhibiting as they do so great a waste of life in the puerperal period in Bengal, will surprise my readers as they have me. Truly they are deeply instructive, as giving some obscure insight into the kind of domestic evils which still, through ignorance, and dull, inveterate prejudice, infest the dark places of the earth. No one hitherto has been aware, or at least has intimated, that such evils exist. "'Tis distance lends enchantment to the view," the poet tells us, and this also it is that clothes remote Oriental regions, as to the moral aspects they present, with deceptive appearances. It is investigation, and investigation alone, honestly and zealously pursued, that can bring into open day, and set before the eyes of the civilized world, the actual social miseries which still afflict those portions of the human family to whom the Christian religion, (the spring of true humanity first, and then, as experience shows, of true science,) remains unknown. To a casual observer, things so deplorable as those just referred to in the domestic life of the natives of Calcutta, scarce ever come out to view; but it may well be surmised that, besides these, there are many other evils unsuspected, which diligent inquiry will gradually bring to light; and for which remedies will be suggested, and slowly, at best very slowly, applied.

The rate of mortality, on the evidence of M. Gupta, is so excessively high as, I confess, may stagger belief. But let us in a spirit of doubt, if we will, suppose that, instead of one native woman out of four or five dying in childbed, the proportion to be one in ten, one in fifteen, or one even in twenty, still the rate will be extraordinarily high. In England, it so happens, we possess few data for determining the rate of mortality in the childbed period. Our own midwifery science, it becomes us humbly to confess, is but of yesterday; and a couple of centuries ago it ranked, I should infer, below that of the Chinese.* It was only in 1745 that Bartholomew Moss, surgeon and licentiate of midwifery, opened an hospital in George's Lane, Dublin, for the relief of poor lying-in women, furnished with twenty-eight beds; which hospital, he says, was the first of the kind attempted in his Majesty's dominions.† The usefulness of the institution, however, being quickly observed, not only for the relief it afforded, but on account of the number of instructed midwives it began to disperse over the kingdom, as also the clinical instruction it supplied to surgeons destined to practice midwifery, whereby "their resort to France and other foreign parts," as had hitherto been the case, was rendered unnecessary; application, in consequence, was made in the year 1747, by persons belonging to the metropolis of England, to the directors of the Dublin Hospital, for their plan and regulations; and an hospital (the British Lying-in) was accordingly established in London the year following.*

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* See a translation of a very curious brief Chinese treatise on midwifery, communicated by Dr Churchill. The Dublin Medical Journal, vol. xx. p. 333.

† Dr Denman says that Sir Richard Manningham, in the year 1739, established a ward or small hospital in the parochial infirmary of St James's, Westminster, for the reception of parturient women only, "which was the first thing of the kind in the British dominions." Preface to Midwifery, 6th edition.

Now the results of experience in these two hospitals, and of other midwifery institutions, have been published, and I do not find in any a higher rate of mortality than one death in forty-two; which occurs in the first ten years of the British Lying-in Hospital.† But what worth the mention is this compared with the Hindu proportion of one woman out of every four or five.

We need not lament over the fate of Hindu mothers as though their case were beyond hope. We too have had our dark age of midwifery, and a long age it was. It is well for us to remember how very recent, in any extended sense, (that is as benefiting the smaller towns and remote rural parts,) is the cultivation of the healing art in England. Eighty years ago, there were no medical periodicals, either quarterly, monthly, or weekly, to collect and diffuse the results of experience and observation, as there are in the present day. The medical mind generally was dormant or lifeless. The only medium, except independent publication, for medical productions, was the annual volume of the Transactions of the Royal Society, where now and then might be found such cases as that of "a monstrous boy seen at Montpelier," or that of "a woman speaking without a tongue," or that of "a man who lived eighteen years on water," and such like, narrated, we may infer, with no other design or desire than to excite wonder. As late as the year 1751, I find a writer in the Gentleman's Magazine proposing to the editor that medical papers should have a place in that (at the time) the sole English magazine;‡ and a couple of years subsequently, we have the project carried into effect as far as a single communication on midwifery goes; whose value may be judged of by this:—it is entitled, "How to procure an easy delivery to women with child," and the nostrum is a plaster over the umbilicus of laurel leaves made up with oil." We have the assurance of the writer that as soon as this is done, "in whatever unnatural or irregular position the child may be, it will immediately turn and present itself readily and in the best and most happy manner."§

But later even than the period mentioned, the treatment of lying-in women in the provinces, whatever it might be amongst the educated in London, was irrational, and in the same degree destructive to life. Proofs to this effect might be produced and to any extent multiplied; but I will confine myself to what we have concerning Manchester, and on the authority of the well-known Charles White, as found in his Treatise "on the Management of Pregnant and Lying-in Women."*

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* See the case of Bartholomew Moss, &c., humbly offered to the consideration of the Honourable House of Commons, 1755. Also His Majesty's Royal Charter for incorporating the Dublin Lying-in Hospital, dated 1756.

† See Willan on Diseases of London.

‡ Gentleman's Magazine, "Proposals for a Medical Correspondence," June 19, 1751, vol. xxi. p. 208.

§ Gent. Mag., vol. xxiii. p. 461.

"If the woman's pains be not strong enough," says Mr White, "her friends are generally pouring into her large quantities of strong liquors mixed with warm water; and if her pains be very strong the same kind of remedy is made use of to support her. As soon as she is delivered, if she be a person in affluent circumstances, she is covered up close in bed with additional clothes; the curtains are drawn round the bed and pinned together, every crevice in the windows and door is stopped close, not excepting even the key hole. The windows are guarded not only with shutters and curtains, but even with blankets the more effectually to exclude the fresh air, and the good woman is not suffered to put her arm or even her nose out of bed for fear of catching cold. She is constantly supplied out of the spout of a tea-pot with large quantities of warm liquors to keep up perspiration and sweat, and her whole diet consists of them. She is confined to a horizontal posture for many days together, whereby both the stools and the lochia are prevented from having a free exit, &c."—"In a few days after delivery the patient is perhaps seized with a shivering fit, and the nurse is surprised, as she protests that she has not had the least waft of cold; more clothes are heaped upon her, spirituous liquors and hot spices are given her to throw off the cold fit, which most certainly increase the succeeding hot one," &c. &c.

One, of course, is not surprised to find that the mortality in childbed was so alarming and notorious, both in the neighbourhood and in distant parts of the country, as to acquire for the fatal disease the name of "the Manchester Fever."—"My father informed me," writes Mr White, "that he attended the third wife of a gentleman who had lost his two former wives by miliary fevers in their first lying-in;" and, in the present instance, the lady was in an agony of terror lest she too should die of the "Manchester fever;" an event happily prevented by the judicious treatment of the elder White. The treatise referred to of Mr Charles White, besides its intrinsic value, is interesting as a kind of way-mark by which we may take notice of the great advance that has been made with respect to the nursing and medical treatment of the lying-in in the course of scarce two generations; a progress that may encourage us in reference even to the Hindus.

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* A Treatise, &c. I quote from the 5th edition, 1791.

There is no question that what M. Gupta says on the benefits that would result from educating native women for midwives and sick-nurses is just, and that this would in fact be one of the greatest boons that could be conferred upon the women of Bengal. His wise suggestions are now being fulfilled, I presume, to some extent at the Medical College, Calcutta; the philanthropy, zeal, and ability of whose professors I have had opportunity in several ways of estimating and admiring. May I be permitted to express a hope that this trifling paper, by making known to European readers the deficiencies of native knowledge in midwifery, and the destructive nature of the prevailing prejudices, will be a means of stimulating enquiry yet further into the arcana of social life in the numerous races of people under our rule in the East? I should rejoice, also, to believe it likely in any the least degree to lessen antipathies and prejudices, that still linger in high professional places in England, against the cultivators of obstetric medicine. Has any branch of the profession, I would ask, made a progress equal to midwifery? or is there any branch besides which, in the walks of practice, and by the instruction imparted at lying-in charities to nurses and female midwives, confers such universal benefits on society? If this be indisputable, as I assume that it is, we may surely hope that at no distant period more encouragement will be extended (on the part of dignified corporations who have it to bestow) to the cultivation of obstetric science, concerning which no persons have ever thought meanly; excepting those who were ignorant of the difficulties to be encountered in its practical pursuit, as well as of the ease and safety with which, in the hands of the well-trained accoucheur, those difficulties are now overcome.

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## ART. V.—*Statistics of the Royal Infirmary of Glasgow. Second Series, compiled from the Records of the Institution for* 1845. By R. S. ORR, M. D., Superintendent of the Royal Infirmary.

IN preparing a second series of statistics of the Glasgow Royal Infirmary, it has been thought advisable to follow the same general plan as was adopted in those of the former year, as in this way, a comparison between the two series will be easily practicable. At the same time a few additional tables have been introduced, which it is hoped will not prove uninteresting to the statistical inquirer.

It may however be premised, that the great influx of medical and surgical patients during the year rendered it necessary to open three of the unoccupied wards in the fever hospital for the reception of the overplus, these wards having been previously shut for a considerable time, in consequence of the fever cases being so few in number. For this reason, although the statistics of the two hospitals could not be kept distinct as formerly, yet those of the medical and surgical wards have been carefully distinguished from those of the fever wards, which amounts to nearly the same thing.

## I. STATISTICS OF THE MEDICAL AND SURGICAL WARDS.

There were in these wards on the 1st of January 1845, 176 patients; there were admitted during the year, 2459; and there remained on the 31st of December 177, showing a total of 2458 cases treated to a termination during the year. Of these 1556 were males, of whom 134 died; and 902 were females, of whom 100 died.

There were treated in the medical wards 1075 patients; of whom 626 were males, and of these 72, or 1 in 8·7 died; 449 were females, and of these 76, or 1 in 5·9 died.

There were treated in the surgical wards 1383 patients; of whom 930 were males, and of these 62, or 1 in 15 died; 453 were females, and of these 24, or 1 in 18·4 died.

Of the above 2458 patients there were found to be

| | Scotch. | Irish. | English. | Foreigners. | Total. |
|---|---|---|---|---|---|
| Males, | 1077 | 417 | 44 | 18 | 1556 |
| Females, | 674 | 218 | 8 | 2 | 902 |
| | 1751 | 635 | 52 | 20 | 2458 |

It therefore appears that, of the whole number treated, 71·23 per cent. were natives of Scotland, 25·83 per cent. were natives of Ireland, 2·11 per cent. were natives of England, and 0·81 per cent. were foreigners. According to Dr Watt's Report* of the Local Census of Lanarkshire for 1841, it appears that, "of the whole population of Glasgow and suburbs (amounting to 282,134) very nearly 16 per cent. were natives of Ireland, 2·23 per cent. were natives of England, 0·18 per cent. were foreigners, and the remaining 80·53 per cent. were natives of Scotland." Disease in general seems, therefore, to have affected the Irish in a much greater proportion than it has the Scotch; and it will be afterwards shown that, during the past year, the former have been affected with fever in a still greater proportion than the latter.

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* Report of the Local Census of Lanarkshire, by Alexander Watt, LL.D. Member of the Statistical Society of Glasgow, &c. &c. Glasgow, 1841, p. 25.

**Table I.** presents a numerical analysis of the admissions, dismissions, deaths, average number in hospital, and mortality per cent. of the cases treated to a termination for each month in the year.

| 1845. | Medical and Surgical Wards. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Admitted. | | | Dismissed. | | | Died. | | | Aver. No. in Hosp. | | | Mortality per cent. | | |
| | Tot. | M. | F. | Tot. | M. | F. | Tot | M. | F. | Tot | M. | F. | Tot. | M. | F. |
| January, | 213 | 132 | 81 | 152 | 101 | 51 | 10 | 6 | 4 | 214 | 130 | 84 | 6·1 | 5·6 | 7·2 |
| February, | 231 | 138 | 93 | 193 | 114 | 79 | 20 | 13 | 7 | 236 | 134 | 102 | 9·3 | 10·2 | 8·1 |
| March, | 200 | 123 | 77 | 193 | 121 | 72 | 16 | 6 | 10 | 248 | 146 | 102 | 7·6 | 4·7 | 12·1 |
| April, | 206 | 131 | 75 | 181 | 110 | 71 | 27 | 13 | 14 | 233 | 143 | 90 | 12·9 | 10·5 | 16·4 |
| May, | 175 | 112 | 63 | 206 | 125 | 81 | 25 | 14 | 11 | 200 | 131 | 69 | 10·8 | 10· | 11·9 |
| June, | 186 | 124 | 62 | 169 | 121 | 48 | 24 | 18 | 6 | 184 | 116 | 68 | 12·4 | 12·9 | 11·1 |
| July, | 224 | 144 | 80 | 168 | 106 | 62 | 16 | 11 | 5 | 189 | 119 | 70 | 8·6 | 9·4 | 7·4 |
| August, | 191 | 124 | 67 | 201 | 131 | 70 | 20 | 9 | 11 | 195 | 128 | 67 | 9· | 6·4 | 13·5 |
| Sept. | 212 | 146 | 66 | 176 | 120 | 56 | 19 | 9 | 10 | 182 | 124 | 58 | 9·7 | 6·9 | 15.1 |
| October, | 200 | 119 | 81 | 178 | 105 | 73 | 17 | 13 | 4 | 199 | 132 | 67 | 8·7 | 11· | 5·1 |
| Nov. | 221 | 156 | 65 | 189 | 137 | 52 | 17 | 9 | 8 | 221 | 149 | 72 | 8·2 | 6·1 | 13·3 |
| Dec. | 200 | 120 | 80 | 218 | 143 | 75 | 23 | 13 | 10 | 216 | 135 | 81 | 9·5 | 8·3 | 11·7 |
| Total, | 2459 | 1569 | 890 | 2224 | 1434 | 790 | 234 | 134 | 100 | 209 | 132 | 77 | 9·5 | 8·5 | 11·2 |

**Table II.** shows the number of patients treated in the medical and surgical wards during the year 1845, arranged under twelve heads according to their diseases.

| Diseases. | Case | Cur. | | Re-liev. | | Dismis. fm. oth. causes. | | Died. | | Mortality per cent. | | | Aver. resi-dence | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F. | M | F. | M. | F. | M | F. | Tot. | M. | F. | M. | F. |
| I. Fevers. | | | | | | | | | | | | | | |
| Bilious fever, | 4 | 3 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 14 | 14 |
| Continued fever, | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | . | ... | ... | 19 | ... |
| Typhus fever, (complic.) | 2 | ... | 2 | ... | ... | ... | ... | ... | .. | . | ... | .. | ... | 60 |
| Febricula, | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... | 13 | ... |
| Ague, | 1 | 1 | ... | ... | ... | .. | ... | ... | ... | . | ... | .. | 9 | ... |
| Scarlatina, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... | 44 | |
| Total, | 12 | 8 | 3 | ... | ... | 1 | ... | ... | ... | ... | .. | ... | ... | |
| II. Nervous System. | | | | | | | | | | | | | | |
| Anæsthesia, | 1 | ... | ... | ... | ... | 1 | .. | ... | ... | ... | ... | ... | 162 | |
| Apoplexy, | 5 | 1 | ... | ... | ... | ... | ... | 3 | 1 | 80· | 75· | 100· | 10 | 2 |
| Cephalalgia, | 11 | 6 | 3 | ... | 1 | 1 | .. | ... | ... | .. | ... | ... | 16 | 84 |
| Chorea, | 3 | ... | 2 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 115 | 48 |
| Delirium tremens, | 6 | 3 | ... | ... | ... | ... | ... | 3 | ... | 50· | 50· | .. | 13 | ... |
| Epilepsy, | 13 | 1 | 1 | 4 | 3 | 2 | 2 | ... | ... | ... | .. | ... | 46 | 32 |
| Hemiplegia, | 25 | 5 | 2 | 7 | 5 | 3 | 3 | ... | . | ... | ... | ... | 45 | 52 |
| Hypochondriasis, | 5 | 2 | ... | 2 | ... | 1 | ... | ... | ... | ... | ... | | 28 | ... |
| Hysteria, . | 12 | ... | 7 | ... | 1 | ... | 4 | .. | ... | ... | .. | .. | .. | 17 |
| Imbecility, | 2 | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | ... | 7 | 25 |
| Mania, | 2 | ... | ... | ... | ... | 1 | 1 | ... | ... | .. | ... | ... | 1 | 23 |
| Meningitis, | 1 | 1 | .. | ... | ... | .. | ... | ... | .. | ... | ... | ... | 29 | |
| Neuralgia, | 5 | 1 | . | 2 | 1 | 1 | ... | ... | ... | ... | .. | ... | 43 | 49 |

| Diseases. | Case | Cured. | | Reliev. | | Dismis. fm. oth. causes. | | Died. | | Mortality per cent. | | | Aver. residence. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F. | M | F. | M. | F. | M | F. | Tot. | M. | F. | M. | F. |
| Paraplegia, . | 15 | 2 | ... | 5 | ... | 1 | 5 | 1 | 1 | 13·3 | 11·1 | 16·6 | 78 | 70 |
| Paralysis general, . | 3 | ... | ... | 2 | ... | 1 | ... | .. | ... | ... | ... | ... | 73 | ... |
| Paralysis partial, | 7 | 4 | ... | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | 27 | ... |
| Sciatica, . | 9 | 7 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | 21 | 17 |
| Spinal irritation, . | 8 | ... | 5 | 1 | 1 | 1 | ... | ... | .. | ... | ... | ... | 53 | 41 |
| Tetanus (idiopathic,) | 1 | 1 | ... | ... | ... | ... | ... | .. | ... | ... | ... | ... | 56 | ... |
| Total, | 134 | 34 | 21 | 25 | 14 | 16 | 15 | 7 | 2 | 6·7 | 8·5 | 3·8 | ... | ... |
| III. Circulatory System, | | | | | | | | | | | | | | |
| Aneurism of aorta, | 3 | ... | ... | | ... | 2 | ... | ... | 1 | 33·3 | ... | 100· | 60 | 20 |
| Aneurism, popliteal, | 3 | 2 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 20 | ... |
| Brachial artery ruptured, | 1 | 1 | ... | ... | ... | . . | ... | ... | ... | . . | ... | ... | 17 | ... |
| Effects of lig. of fem. art. | 1 | 1 | ... | ... | ... | ... | .. | . | .. | ... | ... | .. | 6 | ... |
| Endo-pericarditis, . | 1 | 1 | ... | ... | ... | ... | ... | ... | . . | ... | ... | ... | 61 | ... |
| Disease of heart, | 39 | .. | ... | 5 | 7 | 6 | 5 | 7 | 9 | 41· | 38·8 | 42 8 | 32 | 28 |
| Naevus maternus, . | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 7 |
| Palpitation, . | 1 | 1 | ... | .. | ... | ... | ... | ... | ... | ... | .. | ... | 2 | ... |
| Phlebitis of femoral veins, | 1 | ... | ... | 1 | . . | ... | ... | ... | ... | ... | ... | ... | 22 | ... |
| Purpura, . . | 2 | 2 | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | 24 | ... |
| Varicose veins, . | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | .. | ... | 6 |
| Total, | 54 | 8 | 1 | 6 | 8 | 9 | 5 | 7 | 10 | 31·4 | 23·3 | 41·6 | ... | ... |
| IV. Respiratory System. | | | | | | | | | | | | | | |
| Asthma, . . | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | .. | ... | 23 | ... |
| Bronchitis, . . | 84 | 44 | 29 | 3 | 2 | 4 | ... | 2 | .. | 2·3 | 3·7 | ... | 26 | 31 |
| Empyema, . | 1 | ... | ... | ... | ... | ... | ... | 1 | ... | 100· | 100· | ... | 16 | ... |
| Gangrene of lungs, . | 2 | ... | ... | ... | ... | ... | ... | 1 | 1 | 100· | 100· | 100· | 32 | 8 |
| Hæmoptysis, . | 3 | 1 | ... | ... | 1 | ... | 1 | ... | . | ... | ... | ... | 24 | 16 |
| Laryngitis, . . | 9 | 1 | ... | 2 | ... | 2 | ... | 3 | 1 | 44·4 | 37·5 | 100· | 18 | 8 |
| Pleuritis, . | 18 | 11 | 1 | 2 | 2 | 1 | 1 | ... | ... | ... | ... | ... | 42 | 26 |
| Pleuropneumonia, . | 4 | 1 | ... | ... | ... | ... | ... | 3 | .. | 75· | 75· | ... | 67 | ... |
| Pneumonia, . | 24 | 12 | 3 | 4 | .. | ... | ... | 5 | ... | 20·8 | 23·8 | . . | 22 | 45 |
| Phthisis. . . | 70 | ... | ... | 14 | 8 | 12 | 6 | 16 | 14 | 42·8 | 38· | 50· | 35 | 29 |
| Pulmonary emphysema, | 15 | 3 | 1 | 6 | 3 | 1 | 1 | ... | ... | ... | ... | ... | 44 | 33 |
| Total, | 233 | 76 | 34 | 31 | 16 | 20 | 9 | 31 | 16 | 20·1 | 19·6 | 21·3 | ... | ... |
| V. Genito-Urinary Syst. | | | | | | | | | | | | | | |
| Amenorrhœa, . | 2 | ... | 1 | .. | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 32 |
| Ardor urinæ, . | 1 | 1 | . | ... | ... | ... | ... | ... | ... | ... | . . | ... | 2 | ... |
| Bladder diseased, . | 8 | 4 | 3 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 27 | 31 |
| Calculus in urethra & between prepuce & g.!penis | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | ... |
| ——— in vesica, . | 3 | 2 | ... | ... | ... | ... | ... | 1 | ... | 33·3 | 33·3 | ... | 18 | ... |
| Cancer, chimney sweeper's | 2 | 1 | ... | ... | ... | ... | ... | 1 | ... | 50· | 50· | ... | 19 | ... |
| ——— of labia pudend. | 2 | . . | ... | ... | 2 | ... | ... | ... | ... | ... | ... | ... | ... | 34 |
| ———& phagedena of pen. | 2 | 1 | ... | ... | ... | ... | ... | 1 | ... | 50· | 50· | ... | 22 | ... |
| Chlorosis, . . | 3 | ... | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 22 |
| Congenital adhesion of prepuce to glans penis, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 26 | ... |
| Delivery, sequelæ of, | 3 | ... | 1 | ... | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | 21 |
| Diabetes insipidus, . | 2 | .. | ... | 1 | ... | 1 | ... | ... | ... | .. | ... | ... | 48 | ... |
| ——— mellitus, | 13 | ... | ... | 10 | ... | 3 | .. | ... | ... | ... | ... | ... | 58 | ... |
| Epididymis, induration of, | 1 | . . | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 19 | ... |
| Fistula, urinary, . | 4 | ... | ... | 2 | .. | 2 | ... | ... | ... | .. | ... | ... | 21 | ... |
| ——— vesico-vaginal | 5 | ... | ... | ... | 2 | ... | 3 | ... | ... | ... | ... | ... | ... | 18 |

| Diseases. | Case. | Cured. | | Reliev. | | Dismis. fm. oth. causes. | | Died. | | Mortality per cent. | | | Aver. residence. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F | M | F. | M. | F. | M | F. | Tot. | M. | F. | M | F. |
| Gonorrhœa, | 9 | 3 | 4 | ... | ... | ... | 2 | ... | .. | .. | ... | ... | 11 | 30 |
| Hæmaturia, | 2 | ... | ... | 2 | ... | ... | ... | ... | ... | ... | ... | ... | 10 | ... |
| Hydrocele, | 15 | 11 | ... | 2 | | 2 | ... | .. | ... | ... | ... | ... | 27 | ... |
| Hydro-sarcocele, | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 59 | ... |
| Leucorrhœa, | 2 | ... | .. | .. | 2 | ... | ... | ... | ... | ... | ... | .. | ... | 24 |
| Menorrhagia, | 3 | ... | 1 | ... | 2 | ... | ... | ... | ... | ... | ... | ... | ... | 44 |
| Orchitis, | 12 | 11 | ... | 1 | ... | ... | ... | ... | ... | ... | .. | ... | 26 | ... |
| Ovarian disease, | 4 | ... | ... | ... | 2 | ... | 1 | ... | 1 | 25· | ... | 25· | ... | 24 |
| Prolapsus uteri, | 3 | ... | ... | ... | 1 | ... | 1 | ... | 1 | 33·3 | ... | 33·3 | ... | 12 |
| Pregnancy, | 3 | ... | ... | ... | ... | ... | 3 | ... | ... | ... | ... | ... | ... | 8 |
| Prostate, diseased, | 1 | .. | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 2 | ... |
| Puerperal fever, | 4 | ... | 2 | ... | 1 | .. | ... | ... | 1 | 25· | ... | 25· | ... | 30 |
| Syphilis, primary, | 27 | 20 | 6 | ... | ... | ... | 1 | ... | ... | .. | ... | ... | 30 | 26 |
| ——— secondary, | 111 | 53 | 35 | 8 | 7 | 2 | 3 | 1 | 2 | 2·7 | 1·5 | 4·2 | 35 | 39 |
| Testicle, disease of, | 8 | 6 | ... | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | 38 | ... |
| Urethra, rupture of, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 105 | . |
| ——— stricture of, | 7 | 6 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 29 | ... |
| Urine, incontinence of, | 2 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 16 | ... |
| ——— infiltration of, | 3 | 2 | ... | ... | ... | ... | .. | 1 | ... | 33·3 | 33·3 | ... | 34 | ... |
| ——— retention of, | 9 | 4 | ... | 3 | ... | 2 | ... | ... | ... | ... | ... | ... | 20 | ... |
| Uterine disease, | 10 | ... | .. | ... | 2 | ... | 1 | ... | 7 | 70· | ... | 70· | ... | 43 |
| Total, | 292 | 132 | 55 | 33 | 24 | 15 | 16 | 5 | 12 | 5·8 | 2·7 | 11·2 | ... | ... |
| VI. Gland. & Secret. Syst. | | | | | | | | | | | | | | |
| Abscess of abdom. parietes, | 3 | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 17 | .. |
| ——— of axilla, | 1 | 1 | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... | 24 | ... |
| ——— of back, | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 11 | ... |
| ——— of breast, | 5 | 1 | 3 | .. | 1 | ... | ... | ... | ... | ... | ... | ... | 44 | 19 |
| ——— of foot, | 4 | 3 | 1 | ... | ... | ... | .. | ... | ... | ... | ... | ... | 34 | 13 |
| ——— of forearm, | 5 | 4 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 | 27 |
| ——— of leg and thigh, | 7 | 3 | 2 | ... | ... | 2 | ... | ... | ... | ... | ... | ... | 21 | 40 |
| ——— lumbar, | 6 | ... | ... | 3 | ... | 2 | ... | 1 | ... | 16·6 | 16·6 | ... | 25 | .. |
| ——— of neck, | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 24 | ... |
| ——— over patella, | 3 | 3 | ... | ... | ... | . | ... | ... | ... | ... | ... | ... | 12 | ... |
| ——— pelvic, | 8 | ... | 6 | ... | 1 | ... | .. | ... | 1 | 12·5 | ... | 12·5 | ... | 45 |
| ——— perineal, | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 21 | ... |
| ——— psoas, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 40 | ... |
| ——— of scalp, | 1 | ... | ... | 1 | ... | ... | .. | ... | ... | ... | ... | ... | 23 | ... |
| Bronchocele, | 1 | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 6 |
| Cancer of mamma, | 8 | ... | 4 | .. | ... | ... | 4 | ... | ... | ... | ... | ... | ... | 17 |
| Cynanche parotidea, | 1 | 1 | ... | . | ... | ... | ... | ... | ... | ... | ... | ... | 9 | ... |
| Dis. axill. & inguin. glands, | 3 | 2 | 1 | .. | ... | ... | ... | ... | .. | ... | ... | ... | 8 | 2 |
| —— kidneys, | 7 | 1 | 2 | ... | .. | ... | ... | 4 | ... | 57·1 | 80· | ... | 57 | 20 |
| —— liver, | 5 | 1 | ... | 1 | ... | 1 | ... | 2 | ... | 40· | 40· | ... | 22 | ... |
| —— spleen, | 5 | 2 | 1 | ... | 1 | ... | 1 | ... | ... | .. | ... | ... | 23 | 55 |
| Mamma, hydatids of, | 1 | ... | ... | ... | ... | ... | 1 | ... | ... | ... | .. | ... | ... | 15 |
| Hepatitis, | 5 | 3 | 1 | ... | ... | ... | ... | 1 | ... | 20· | 25· | ... | 38 | 31 |
| Icterus, | 4 | ... | 1 | 1 | ... | ... | ... | 1 | 1 | 50· | 50· | 50· | 64 | 40 |
| Nephritis, | 4 | 2 | ... | ... | ... | 1 | ... | ... | 1 | 25· | ... | 100· | 58 | 20 |
| Total, | 96 | 37 | 23 | 7 | 3 | 7 | 7 | 9 | 3 | 12·5 | 15· | 8·3 | ... | ... |
| VII. Integumentary Syst. | | | | | | | | | | | | | | |
| Abdominal sinus, | 2 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 16 | ... |
| Anasarca, | 10 | 5 | 3 | .. | 2 | ... | . | ... | ... | ... | ... | ... | 27 | 15 |
| Bedsores, | 3 | ... | 2 | ... | 1 | .. | ... | .. | | ... | .. | | ... | 60 |
| Bunion, | 2 | ... | 2 | ... | .. | ... | ... | ... | ... | ... | ... | . | ... | 17 |

| Diseases. | Case. | Cured. | | Re-liev. | | Dismis. fm. oth. causes. | | Died. | | Mortality per cent. | | | Aver residence. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F | M | F | M. | F. | M | F. | Tot. | M. | F. | M. | F. |
| Carbuncle, | 5 | 3 | 2 | ... | ... | . | ... | . . | ... | ... | ... | ... | 26 | 40 |
| Cicatrices from burns, | 3 | 2 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 33 | 41 |
| Contrac. of masseter musc. | 1 | 1 | ... | ... | ... | .. | ... | .. | ... | ... | ... | ... | 82 | ... |
| Dog-bite, | 2 | ... | 1 | ... | ... | ... | ... | 1 | ... | 50· | 100· | ... | 11 | 53 |
| Furuncle, | 2 | ... | 1 | ... | ... | .. | ... | ... | ... | ... | ... | ... | .. | 60 |
| Inflam. subcell. and fascial, | 6 | 3 | 1 | ... | ... | ... | ... | 1 | 1 | 33·3 | 25· | 50· | 19 | 51 |
| Onychia, | 4 | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 28 | 39 |
| Sinus in thigh, | 1 | 1 | ... | ... | ... | .. | ... | ... | ... | ... | . . | ... | 28 | ... |
| Torticollis, | 1 | 1 | | ... | ... | ... | ... | ... | ... | ... | ... | ... | 23 | ... |
| Ecthyma, | 5 | 5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 30 | ... |
| Eczema, | 27 | 13 | 7 | 2 | 1 | 1 | 2 | 1 | ... | 3·7 | 5·8 | ... | 35 | 48 |
| Herpes, | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... | 69 | ... |
| Ichthyosis, | 2 | ... | ... | 2 | ... | ... | . . | ... | ... | ... | ... | ... | 74 | ... |
| Impetigo, | 6 | 4 | 1 | ... | ... | 1 | .. | ... | ... | ... | ... | ... | 41 | 19 |
| Lepra, | 6 | 2 | 3 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 37 | 47 |
| Lichen, | 3 | .. | ... | ... | 2 | 1 | ... | ... | ... | ... | ... | ... | 12 | 13 |
| Porrigo favosa, | 7 | 4 | 1 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | 60 | 31 |
| Prurigo, | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | .. | 18 | ... |
| Psoriasis, | 18 | 2 | 9 | 3 | 2 | 2 | ... | ... | ... | ... | ... | ... | 62 | 44 |
| Rupia, | 7 | 7 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | ... |
| Scabies, | 22 | 19 | 3 | ... | ... | ... | .. | ... | ... | ... | ... | ... | 31 | 34 |
| Sibbens, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | ... |
| Erysipelas and erythema, | 46 | 21 | 21 | ... | ... | .. | ... | 2 | 2 | 8·6 | 8·6 | 8·6 | 27 | 32 |
| Total, | 197 | 102 | 60 | 10 | 8 | 6 | 3 | 5 | 3 | 4· | 4· | 4· | ... | .. |
| VIII. Osseous System. | | | | | | | | | | | | | | |
| Fractures, 1. Simple | | | | | | | | | | | | | | |
| Of bones of upper extrem. | 83 | 45 | 31 | 1 | 1 | 3 | 1 | 1 | ... | 1.2 | 2. | .. | 22 | 26 |
| ——of lower extremities | 98 | 58 | 31 | 4 | 2 | 1 | 1 | ... | 1 | 1. | ... | 2.8 | 41 | 41 |
| Of jaw, | 4 | ... | 2 | ... | ... | 1 | .. | 1 | ... | 25. | 50. | ... | 24 | 24 |
| — os nasi, | 1 | 1 | ... | ... | ... | ... | ... | .. | ... | ... | ... | ... | 11 | ... |
| — ribs, | 8 | 5 | 2 | ... | ... | ... | ... | 1 | ... | 12.5 | 16.6 | ... | 9 | 14 |
| — pelvis, | 3 | 1 | ... | ... | ... | ... | ... | 2 | ... | 66.6 | 66.6 | ... | 14 | ... |
| — spine, | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 58 | ... |
| Fractures, 2. Compound. | | | | | | | | | | | | | | |
| Of bones of upper extrem. | 8 | 7 | ... | ... | ... | 1 | .. | ... | ... | ... | ... | ... | 40 | ... |
| ——of lower extremities | 34 | 16 | 1 | .. | ... | 1 | . . | 11 | 5 | 47. | 39.2 | 83.8 | 43 | 26 |
| Of jaw, | 2 | 1 | ... | ... | ... | ... | ... | 1 | .. | 50. | 50. | . | 2 | ... |
| — os nasi, | 3 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | . | 9 | ... |
| Fractures 3. Comminuted. | | | | | | | | | | | | | | |
| Of bones of upper extrem. | 2 | 1 | 1 | ... | .. | ... | ... | ... | ... | ... | ... | .. | 12 | 36 |
| ——of lower extremities | 6 | 5 | ... | ... | ... | ... | ... | 1 | ... | 16. | 16.6 | ... | 77 | ... |
| Curvature of spine, | 5 | ... | 2 | 2 | ... | ... | 1 | ... | ... | ... | ... | .. | 26 | 23 |
| —— congen. of tibia, | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 16 | .. |
| Caries of carpus, | 2 | ... | ... | 1 | 1 | ... | . . | ... | ... | ... | ... | ... | 86 | 42 |
| —— fingers, | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 13 | ... |
| —— foot, | 2 | ... | ... | 1 | .. | 1 | ... | ... | ... | ... | ... | ... | 17 | ... |
| —— great toe, | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 60 |
| —— metatarsus, | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 62 | .. |
| —— os calcis, | 5 | ... | 1 | ... | ... | 1 | 3 | ... | ... | ... | ... | ... | 3 | 49 |
| —— stump, | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... | 50 |
| Exostosis of infer. maxilla, | 1 | ... | ... | ... | ... | .. | 1 | ... | ... | ... | ... | .. | . | 2 |
| Jaw, malignant disease of | 6 | 2 | 1 | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... | 16 | 25 |
| Necrosis of femur, | 2 | 1 | . . | ... | ... | ... | ... | 1 | ... | 50. | 50. | . | 44 | .. |
| —— of infer. maxilla, | 1 | . . | .. | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 7 | ... |
| —— of tibia, | 8 | 4 | 1 | ... | 3 | ... | ... | ... | ... | ... | .. | .. | 43 | 53 |
| Osteo-sarcoma of femur, | 2 | 1 | ... | ... | .. | 1 | ... | . | ... | ... | ... | ... | 18 | ... |
| Ostitis, chronic of femur, | 1 | ... | ... | ... | ... | 1 | .. | . | ... | ... | ... | .. | 7 | ... |

| Diseases. | Case | Cured. | | Re-liev. | | Dismis. fm. oth. causes. | | Died. | | Mortality per cent. | | | Ave. residence. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F. | M | F. | M. | F. | M | F. | Tot. | M. | F. | M. | F. |
| Periostitis of carpus, | 1 | ... | ... | 1 | ... | .. | ... | ... | ... | ... | ... | ... | 19 | ... |
| ——— of femur, | 1 | ... | ... | ... | ... | ... | ... | 1 | ... | 100. | 100. | ... | 34 | ... |
| ——— of forearm, | 1 | ... | ... | ... | ... | 1 | . | ... | ... | . | ... | ... | 22 | ... |
| ——— of tibia, | 4 | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 12 | 14 |
| Total, | 302 | 157 | 76 | 13 | 8 | 14 | 8 | 20 | 6 | 8.6 | 9.8 | 6.1 | ... | ... |
| IX. Articular & Fib. Syst. | | | | | | | | | | | | | | |
| Ankle, diseased . | 15 | 5 | ... | 3 | 4 | 1 | 1 | 1 | ... | 6.6 | 10. | ... | 31 | 31 |
| Knee, ——— . | 32 | 8 | 11 | 3 | 4 | 4 | ... | ... | 2 | 6.2 | .. | 11.7 | 36 | 25 |
| Hip, ——— . | 22 | 4 | 2 | 10 | 4 | 2 | ... | ... | ... | ... | ... | ... | 34 | 49 |
| Wrist, ——— . | 5 | 2 | 2 | 1 | ... | ... | ... | ... | .. | ... | ... | ... | 11 | 20 |
| Elbow, ——— . | 3 | 1 | ... | 1 | ... | ... | 1 | .. | ... | .. | ... | ... | 29 | 6 |
| Shoulder——— . | 2 | ... | 1 | 1 | ... | ... | ... | ... | . | ... | ... | ... | 9 | 14 |
| Lumbago, . | 12 | 10 | 1 | 1 | ... | ... | . | ... | ... | ... | ... | ... | 55 | 58 |
| Luxation of ankle | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 12 | ... |
| ——— of femur | 3 | 2 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 25 | ... |
| ——— of thumb(comp.) | 1 | ... | ... | ... | ... | 1 | ... | . | ... | ... | ... | .. | 19 | ... |
| ——— of elbow, | 4 | 3 | ... | ... | ... | 1 | .. | ... | ... | ... | ... | ... | 19 | ... |
| ——— of shoulder, | 4 | 3 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 10 | 16 |
| ——— of scapula, | 2 | 2 | ... | ... | ... | . . | ... | ... | ... | ... | ... | ... | 11 | ... |
| Pleurodynia, . | 6 | 3 | 2 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 15 | 31 |
| Rheumatism, . | 108 | 60 | 37 | 5 | 5 | ... | ... | 1 | ... | .9 | 1.5 | ... | 30 | 27 |
| Talipes varus & equinus, | 6 | 3 | 1 | ... | ... | ... | 2 | ... | ... | ... | ... | ... | 40 | 14 |
| Total, | 226 | 107 | 57 | 25 | 17 | 10 | 6 | 2 | 2 | 1.7 | 1.3 | 2.4 | ... | ... |
| X. Chylopoietic System. | | | | | | | | | | | | | | |
| Abdomen, disease of | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 61 | ... |
| Abdominal anus, | 1 | ... | ... | ... | ... | ... | ... | ... | 1 | 100. | ... | 100. | ... | 17 |
| Ascites & general dropsy, | 29 | 5 | 5 | 2 | 3 | 3 | 4 | 4 | 3 | 24.1 | 28.5 | 20. | 44 | 38 |
| Dropsy, cardiac, | 16 | 6 | ... | . | 1 | ... | 1 | 2 | 6 | 50. | 25. | 75. | 44 | 34 |
| ——— hepatic, | 4 | ... | . . | 1 | 1 | 1 | ... | ... | 1 | 25. | ... | 50. | 41 | 35 |
| ——— renal, | 31 | 11 | 4 | 2 | ... | 1 | 1 | 6 | 6 | 38.7 | 30. | 54.5 | 46 | 34 |
| Cancer of colon, | 1 | .. | ... | ... | ... | ... | ... | ... | 1 | 100. | ... | 100. | ... | 34 |
| ——— of pylorus, | 1 | ... | ... | ... | ... | ... | ... | 1 | ... | 100. | 100. | ... | 16 | ... |
| Colica pictonum, | 4 | 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 21 | ... |
| Condylomata, . | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 9 | ... |
| Diarrhœa, . | 17 | 5 | 3 | 1 | ... | 1 | ... | 3 | 4 | 41.1 | 30. | 57.1 | 10 | 16 |
| Dysentery, . | 12 | 5 | ... | ... | 1 | 2 | 1 | 1 | 2 | 25. | 12.5 | 50. | 28 | 4 |
| Dysphagia, . | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 2 | ... |
| Dyspepsia, . | 78 | 27 | 32 | 10 | 4 | 2 | 3 | ... | ... | ... | ... | ... | 25 | 24 |
| Fistula in ano and perinæo | 13 | 10 | 1 | 1 | ... | 1 | ... | ... | .. | ... | ... | ... | 26 | 5 |
| Gastralgia, . | 1 | ... | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 3 |
| Hæmatemesis, . | 4 | 1 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 25 | 33 |
| Hernia, femoral, | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 7 | ... |
| ——— inguinal, | 3 | 1 | ... | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | 17 | ... |
| Peritonitis, . | 5 | ... | 2 | ... | ... | ... | ... | 2 | 1 | 60. | 100. | 33.3 | 29 | 24 |
| Poisoning with arsenic, | 2 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 10 | 1 |
| ——— with strychnia, | 1 | ... | ... | ... | ... | ... | ... | ... | 1 | 100. | ... | 100. | ... | 11 |
| Prolapsus ani, . | 2 | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 58 | 27 |
| Rectum, scirrhus of, | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 44 | ... |
| Tympanites, . | 1 | 1 | ... | ... | ... | ... | .. | ... | ... | ... | ... | ... | 48 | ... |
| Total, | 231 | 79 | 52 | 20 | 10 | 14 | 11 | 19 | 26 | 19.4 | 14.3 | 26.2 | ... | ... |
| XI. Of the eye, ear, nose, mouth, throat, &c. | | | | | | | | | | | | | | |
| Amaurosis, . | 1 | 1 | ... | ... | ... | . | ... | ... | ... | ... | ... | ... | 6 | ... |

| Diseases. | Case | Cured. | | Re-liev. | | Dismis fm. oth. causes. | | Died. | | Mortality per cent. | | | Aver. resi-dence | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot. | M. | F. | M | F. | M. | F. | M | F. | Tot. | M. | F. | M. | F. |
| Cataract, (traumatic) | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 23 | ... |
| Conjunctivitis, . | 5 | 2 | 2 | 1 | ... | ... | ... | ... | ... | ... | . . | ... | 13 | 26 |
| Corneitis, . | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 21 | ... |
| Eye, injury of, . | 2 | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 9 | ... |
| Dacryocystitis, . | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | ... |
| Iritis, . . | 4 | 1 | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 27 | 25 |
| Ophthalmia, . | 14 | 6 | 5 | 2 | 1 | ... | ... | ... | ... | ... | ... | ... | 17 | 39 |
| Otitis and otorrhœa, | 3 | 2 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 27 | ... |
| Epistaxis . | 1 | 1 | ... | ... | ... | .. | ... | ... | ... | ... | ... | ... | 23 | ... |
| Lupus, . . | 5 | ... | 1 | 2 | 1 | 1 | ... | ... | .. | ... | ... | ... | 40 | 56 |
| Polypus & disease of nose | 8 | 1 | 2 | ... | 4 | 1 | ... | ... | ... | . | ... | ... | 5 | 53 |
| Epulis, . | 1 | 1 | ... | .. | ... | ... | ... | ... | ... | ... | ... | ... | 21 | ... |
| Cheloidea of lips & cheek. | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 22 |
| Cancer and disease of lip, | 9 | 5 | 3 | .. | ... | ... | 1 | ... | ... | ... | ... | ... | 27 | 26 |
| Fistula of cheek, | 1 | 1 | ... | ... | ... | .. | ... | ... | ... | ... | ... | ... | 43 | ... |
| Hare-lip, . | 4 | 3 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 11 | ... |
| Parulis . | 1 | ... | 1 | ... | ... | ... | . | ... | ... | ... | ... | ... | ... | 10 |
| Tongue, diseased, | 3 | ... | 2 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 11 | 44 |
| Aphonia, . | 2 | ... | ... | ... | ... | 2 | .. | ... | ... | ... | ... | ... | 30 | ... |
| Cynanche tonsillaris, | 9 | 3 | 1 | 1 | 4 | ... | ... | ... | ... | .. | ... | ... | 15 | 32 |
| ——— trachealis, | 1 | 1 | ... | ... | ... | .. | ... | ... | ... | ... | ... | ... | 18 | ... |
| Cut throat, . | 3 | 2 | ... | ... | ... | ... | ... | 1 | ... | 33.3 | 33.3 | ... | 11 | ... |
| Total, | 81 | 32 | 21 | 9 | 10 | 7 | 1 | 1 | ... | 1.2 | 2. | ... | ... | ... |
| XII. Miscellaneous. | | | | | | | | | | | | | | |
| Bruises and injuries, | 151 | 113 | 24 | 3 | ... | 3 | ... | 8 | ... | 5.2 | 6.2 | ... | 19 | 19 |
| Burns and scalds, | 76 | 40 | 27 | 3 | ... | ... | ... | 2 | 4 | 7.8 | 4.4 | 12.9 | 26 | 28 |
| Debility, . | 4 | ... | ... | 1 | ... | ... | .. | 1 | 2 | 75. | 50. | 100. | 20 | 15 |
| Fungus hæmatodes, | 1 | ... | ... | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 11 | ... |
| Gangrene of leg, | 1 | .. | ... | ... | ... | ... | ... | 1 | ... | 100. | 100. | ... | 8 | ... |
| ——— of toes, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 32 | ... |
| Injuries of head, | 20 | 10 | 4 | ... | ... | 1 | ... | 3 | 2 | 25. | 21.4 | 33.3 | 19 | 13 |
| Scrofula, . | 12 | 4 | 2 | 1 | 1 | 1 | 2 | ... | 1 | 8.3 | ... | 16.6 | 11 | 59 |
| Sequelæ of submersion, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | .. | 3 | ... |
| *——— swallow. sulph. acid | 3 | ... | 3 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 36 |
| Tumours aqueous encysted | 2 | 1 | 1 | ... | ... | ... | ... | ... | ... | .. | ... | ... | 19 | 27 |
| ——— adipose, | 3 | 1 | 2 | ... | ... | . . | ... | ... | .. | ... | ... | ... | 15 | 11 |
| ——— malignant, | 2 | .. | 1 | ... | ... | 1 | ... | ... | ... | ... | ... | ... | 47 | 15 |
| ——— molluscous, | 1 | ... | 1 | ... | .. | ... | ... | ... | ... | ... | ... | ... | ... | 42 |
| ——— Scrofulous, | 4 | 2 | 1 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | 14 | 26 |
| Wounds of face, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 7 | ... |
| ——— of facial artery, | 1 | 1 | ... | ... | ... | ... | .. | ... | ... | ... | ... | ... | 18 | ... |
| ——— gunshot, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 5 | ... |
| ——— incised, | 11 | 5 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 29 | 10 |
| ——— lacerated, | 31 | 19 | 4 | 2 | ... | ... | 1 | 4 | 1 | 16.1 | 16. | 16.6 | 25 | 25 |
| ——— penetrating, | 1 | ... | ... | ... | ... | .. | ... | 1 | ... | 100. | 100. | ... | 2 | ... |
| ——— poisoned. | 2 | 2 | ... | ... | ... | .. | ... | ... | ... | ... | ... | ... | 27 | ... |
| ——— of scalp, | 24 | 13 | 9 | ... | ... | ... | ... | 2 | ... | 8.3 | 13.3 | ... | 16 | 15 |
| Ulcers, . | 232 | 117 | 91 | 5 | 3 | 5 | 7 | 3 | 1 | 1.7 | 2.3 | .9 | 26 | 33 |
| Moribund, . | 13 | .. | ... | ... | .. | ... | ... | 4 | 9 | 100. | 100. | 100. | 1 | 2 |
| Disease unknown, | 1 | 1 | ... | ... | .. | ... | ... | ... | ... | ... | ... | ... | 31 | ... |
| Total, | 600 | 333 | 176 | 15 | 5 | 12 | 10 | 29 | 20 | 8.1 | 7.4 | 9.9 | ... | .. |

* This was the same individual three times admitted.

On the preceding tables it may be remarked, that a very considerable increase over last year is observable in the numbers treated. An examination of Table II. will show this to be the case in all the systems, with the exception of the fevers, and diseases of the circulatory system. The total increase amounted to 448. The mortality seems to have been greatest among the female cases, as is indicated in Table I.

A little difficulty has been experienced in the arrangement of the dropsies, some cases being reported as ascites and general dropsy, and others as dropsy with diseased heart, or with diseased liver, or with diseased kidneys. It was, however, thought better to refer them to a separate class, distinguishable under these four heads, than to class them along with the diseases which gave rise to them, (although certainly this would have been a more scientific arrangement;) and for these reasons,—*first*, that many of the cases of dropsy were reported cured, in which it was manifestly the dropsy, not the disease which gave rise to it, that was cured; *second*, in many of the organic diseases of the heart, liver, and kidneys, there was no dropsy present, rendering it necessary to have a separate head for each of them; and *lastly*, it was not possible to say on what proximate causes those cases of dropsy that are arranged under the heads of "ascites and general dropsy" depended. The maintaining the distinction above adopted has this advantage, viz. that by adding the numbers of each species of dropsy to those of the corresponding organic disease, as noted in the circulatory and glandular systems, the total number of cases in which each viscus was affected can be arrived at as nearly as is possible. It is interesting to observe how nearly the residence of the patients in all the four species coincides, being for the males from 41 to 46 days, and for the females from 33 to 35 days.

The case of poisoning with strychnia was one, from its rarity, of great interest. The patient was admitted for a cutaneous affection of the scalp, and appeared from her history to have been insane, most probably a case of cleptomania. She was in the habit of stealing the other patients' medicines, and at last lighted upon a box of pills belonging to a paraplegic patient. Each pill contained a quarter of a grain of strychnia; and although warned by the owner of the box of the dangerous nature of its contents, she swallowed three of the pills, and died in about an hour afterwards. An interesting account of the case is given by Dr Watson in the Edinburgh Monthly Journal of Medical Science for December 1845, as also of the case of idiopathic tetanus, noted in the diseases of the nervous system.

A selection will now be made of a few of the more important of the diseases, the numbers of which are sufficiently comprehensive to afford data for arrangement in the tabular form.

Table III. exhibits the cases of Bronchitis, with the mortality, &c. arranged according to the ages of the patients.

| Bronchitis, 1845. | Total cases. | Dismissed. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Av. residence of the cases that died. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M. & F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | 1 | ... | 1 | ... | ... | ... | ... | ... | 11 | ... | 11 | ... | ... | ... |
| 10 to 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 to 20 | 8 | 2 | 6 | ... | ... | ... | ... | ... | 12 | 16 | 10 | ... | .. | ... |
| 20 to 30 | 22 | 15 | 7 | ... | ... | ... | ... | .. | 23 | 22 | 25 | ... | ... | ... |
| 30 to 40 | 18 | 8 | 10 | ... | ... | ... | ... | ... | 32 | 20 | 42 | ... | ... | ... |
| 40 to 50 | 16 | 11 | 3 | 2 | ... | 12·5 | 15·3 | ... | 30 | 32 | 23 | 20 | 20 | ... |
| 50 to 60 | 16 | 14 | 2 | ... | ... | ... | ... | ... | 31 | 31 | 28 | ... | ... | ... |
| above 60 | 3 | 1 | 2 | ... | ... | ... | ... | ... | 22 | 9 | 29 | ... | ... | ... |
| Total, | 84 | 51 | 31 | 2 | ... | 2·3 | 3·7 | ... | 28 | 26 | 31 | 20 | 20 | ... |

Table IV. exhibits the cases of Pneumonia, with the mortality, &c. arranged according to the ages of the patients.

| Pneumonia, 1845. | Total cases. | Dismissed. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Av. residence of the cases that died. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M & F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 to 15 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 to 20 | 4 | 4 | ... | .. | ... | ... | ... | ... | 19 | 19 | ... | ... | ... | ... |
| 20 to 30 | 9 | 5 | 2 | 2 | ... | 22·2 | 28·5 | ... | 23 | 19 | 41 | 5 | 5 | ... |
| 30 to 40 | 6 | 6 | ... | ... | ... | ... | ... | ... | 30 | 30 | ... | ... | ... | ... |
| 40 to 50 | 4 | 1 | 1 | 2 | ... | 50· | 66·6 | ... | 26 | 18 | 51 | 2 | 2 | ... |
| 50 to 60 | 1 | ... | ... | 1 | ... | 100· | 100· | ... | 17 | 17 | ... | 17 | 17 | .. |
| above 60 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Total, | 24 | 16 | 3 | 5 | ... | 20·8 | 23·8 | ... | 25 | 22 | 45 | 6 | 6 | ... |

Table V. exhibits the cases of Phthisis, with the mortality, &c. arranged according to the ages of the patients.

| Phthisis 1845. | Total cases | Dismissed. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Aver. resi. of the cases that died. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M. & F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | ... | ... | ... | . | .. | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 to 15 | 3 | 1 | ... | 1 | 1 | 66·6 | 50· | 100· | 9 | 13 | 2 | 12 | 23 | 2 |
| 15 to 20 | 8 | 5 | 2 | ... | 1 | 12·5 | ... | 33·3 | 35 | 37 | 34 | 40 | ... | 40 |
| 20 to 30 | 30 | 8 | 7 | 7 | 8 | 50· | 46·6 | 53·3 | 35 | 29 | 31 | 34 | 30 | 29 |
| 30 to 40 | 23 | 10 | 4 | 6 | 3 | 39·1 | 37·5 | 42.8 | 37 | 30 | 32 | 39 | 41 | 34 |
| 40 to 50 | 6 | 2 | 1 | 2 | 1 | 50· | 50· | 50· | 16 | 19 | 12 | 14 | 11 | 20 |
| 50 to 60 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| above 60 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | .. | ... | ... |
| Total | 70 | 26 | 14 | 16 | 14 | 42·8 | 38· | 50· | 33 | 35 | 29 | 32 | 35 | 28 |

Table VI. exhibits the cases of Erysipelas, with the mortality, &c. arranged according to the ages of the patients.

| Erysipelas, 1845. | Total cases. | Dismissed. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Aver. resid. of the cases that died. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M.& F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | 1 | ... | 1 | ... | ... | ... | ... | ... | 32 | ... | 32 | ... | ... | ... |
| 10 to 15 | 1 | 1 | .. | ... | ... | ... | ... | ... | 26 | 26 | ... | ... | ... | ... |
| 15 to 20 | 4 | 1 | 3 | ... | ... | . | ... | .. | 16 | 13 | 17 | ... | ... | ... |
| 20 to 30 | 10 | 5 | 4 | ... | 1 | 10· | ... | 20· | 35 | 16 | 54 | 2 | ... | 2 |
| 30 to 40 | 12 | 5 | 7 | ... | ... | ... | ... | ... | 27 | 27 | 28 | ... | ... | .. |
| 40 to 50 | 6 | 3 | 2 | ... | 1 | 16·6 | ... | 33·3 | 28 | 26 | 23 | 21 | ... | 21 |
| 50 to 60 | 5 | 4 | ... | 1 | ... | 20· | 20· | ... | 35 | 35 | ... | 60 | 60 | ... |
| above 60 | 7 | 2 | 4 | 1 | ... | 14·2 | 33·3 | ... | 31 | 38 | 25 | 18 | 18 | — |
| Total, | 46 | 21 | 21 | 2 | 2 | 8·6 | 8·6 | 8·6 | 29 | 27 | 32 | 25 | 39 | 11 |

Table VII. exhibits the cases of Rheumatism, with the mortality, &c. arranged according to the ages of the patients.

| Rheumatism. 1845. | Total cases. | Dismissed | | Died. | | Average residence in days. | | |
|---|---|---|---|---|---|---|---|---|
| Ages. | M.& F. | M. | F. | M. | F. | Tot. | M. | F. |
| 1 to 10 | ... | ... | ... | ... | ... | ... | ... | ... |
| 10 to 15 | ... | ... | ... | ... | ... | ... | ... | ... |
| 15 to 20 | 19 | 8 | 11 | ... | ... | 27 | 21 | 31 |
| 20 to 30 | 46 | 27 | 19 | ... | ... | 30 | 34 | 23 |
| 30 to 40 | 20 | 16 | 3 | 1 | ... | 34 | 37 | 31 |
| 40 to 50 | 16 | 11 | 5 | ... | ... | 24 | 22 | 28 |
| 50 to 60 | 2 | 1 | 1 | ... | .. | 27 | 17 | 37 |
| above 60 | 5 | 2 | 3 | .. | ... | 23 | 11 | 31 |
| Total, | 108 | 65 | 42 | 1 | ... | 29 | 30 | 27 |

From these tables it appears that the females who laboured under bronchitis, pneumonia, and rheumatism escaped, without any fatal result, the mortality being entirely confined to the males, while, on the other hand, the former have been more the victims of phthisis than the latter, their mortality being as high as 50 per cent.; their residence in hospital was less both for the total cases, and also for those that died, than that of the males, so that the disease seems to have destroyed them sooner than it did the other sex.

In the cases of erysipelas, the sexes appear to have been attacked equally by the disease, and it is worthy of notice, that the mortality is found to be exactly the same for both sexes.

The age of those who suffered most from bronchitis, pneumonia, phthisis, and rheumatism was from twenty to thirty, while of those affected with erysipelas, it was from thirty to forty.

The next table gives a view of the number of cases of these diseases admitted during each month of the year, distinguishing the sexes. From this table it appears that they are most prevalent during the months of November, December, January, February, and March, when certainly the weather is most severe and inclement. After this will be given an enumeration of the trades and professions which the patients labouring under these five diseases followed, which will be comprised in two tables, one for the males, the other for the females.

Table VIII. is arranged so as to show the number of males and females affected with these diseases, admitted during each month of the year.

| 1845. | Bronchitis. | | Pneumonia. | | Phthisis. | | Erysipelas. | | Rheumatism | | Totals for each month. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. | F. | M. | F. | M. | F. | M. | F. | |
| January, | 4 | 7 | 1 | 1 | 7 | 2 | 3 | 2 | 6 | 3 | 36 |
| February, | 8 | ... | ... | ... | 2 | 5 | 2 | 3 | 10 | 4 | 34 |
| March, | 4 | 5 | 2 | 1 | 4 | 4 | 2 | ... | 8 | 3 | 33 |
| April, | 5 | 1 | 1 | ... | 3 | 3 | 2 | 4 | 3 | 2 | 24 |
| May, | 2 | 4 | 3 | ... | 4 | 1 | 1 | 2 | 5 | 2 | 24 |
| June, | 2 | 1 | 1 | ... | 3 | 1 | 1 | ... | 3 | 4 | 16 |
| July, | 2 | 2 | 4 | 1 | 2 | 3 | 1 | 1 | 7 | 4 | 27 |
| August, | 4 | ... | 2 | ... | 4 | 3 | 1 | 3 | 4 | 1 | 22 |
| September, | 1 | ... | 2 | ... | 2 | ... | 1 | 2 | 2 | 3 | 13 |
| October, | 3 | 1 | 1 | ... | 3 | 2 | 1 | 4 | 6 | 5 | 26 |
| November, | 9 | 3 | 1 | ... | 3 | 2 | 1 | 2 | 7 | 6 | 34 |
| December, | 9 | 7 | 3 | ... | 5 | 2 | 7 | . | 5 | 5 | 43 |
| Total, | 53 | 31 | 1 | 3 | 42 | 29 | 23 | 23 | 66 | 42 | 332 |

Table IX. exhibits the number of males who were afflicted with these five diseases, arranged according to their trades and occupations, distinguishing the deaths.

| Occupations. Males. | Bronchit. | | Pneumon. | | Phthisis. | | Erysip. | | Rheumat. | | Totals of each oc. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths |
| Actors, | 1 | .. | ... | ... | .. | ... | ... | ... | ... | ... | 1 | ... |
| Bakers, | 2 | ... | ... | ... | ... | .. | ... | ... | ... | ... | 2 | .. |
| Bleachers, | 1 | ... | ... | ... | 2 | . | ... | ... | ... | ... | 3 | ... |
| Brassfounders, | ... | ... | ... | ... | ... | ... | .. | ... | 1 | 1 | 1 | 1 |
| Butchers, | ... | ... | ... | ... | 1 | 1 | ... | ... | 1 | ... | 2 | 1 |
| Calico printers, | 1 | ... | .. | ... | . . | ... | ... | ... | ... | .. | 1 | ... |
| Carpenters, | 2 | ... | 3 | 1 | ... | ... | 1 | 1 | 1 | ... | 7 | 2 |
| Carters, | 3 | ... | 1 | ... | ... | ... | 1 | ... | 2 | ... | 7 | .. |
| Cloth lappers, | 1 | ... | ... | ... | ... | ... | 1 | ... | 1 | ... | 3 | ... |
| Colliers, | 1 | ... | ... | ... | 1 | 1 | 1 | ... | 7 | ... | 10 | 1 |
| Coopers, | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... | 2 | .. |
| Curriers, | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... |
| Dyers, | ... | ... | ... | ... | 1 | ... | 1 | ... | ... | ... | 2 | ... |
| Factory men, | 1 | ... | 1 | ... | 3 | 2 | 4 | ... | ... | ... | 9 | 2 |
| Farm servants, | 2 | ... | ... | .. | 1 | 1 | ... | ... | 2 | ... | 5 | 1 |
| Fishermen, | 1 | ... | ... | ... | 1 | ... | ... | ... | ... | ... | 2 | ... |
| Gardeners, | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | ... | 1 | 1 |
| Glaziers, | ... | ... | ... | ... | 2 | ... | ... | ... | ... | ... | 2 | ... |
| Gunsmiths, | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... |
| Hatters, | ... | ... | ... | ... | 1 | 1 | ... | ... | 1 | ... | 2 | 1 |
| Hawkers, | ... | ... | 1 | 1 | ... | ... | .. | .. | 1 | ... | 2 | 1 |
| Labourers, | 16 | ... | 3 | 1 | 4 | ... | 5 | 1 | 11 | ... | 39 | 2 |
| Men-servants, | ... | ... | ... | ... | ... | ... | ... | ... | 2 | ... | 2 | ... |
| Masons, | ... | ... | ... | . . | ... | ... | ... | ... | 2 | ... | 2 | . |
| Moulders, | ... | ... | ... | ... | ... | ... | ... | ... | 4 | ... | 4 | ... |

| Occupations. Males. | Bronchit. | | Pneumon. | | Phthisis. | | Erysip. | | Rheumat. | | Totals of each oc. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths | Cas. | Dths |
| Nailers, | ... | .. | ... | ... | 1 | ... | ... | ... | ... | ... | 1 | ... |
| Packers, | ... | .. | ... | ... | ... | ... | .. | .. | 1 | ... | 1 | ... |
| Plasterers, | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... |
| Policemen, | 1 | ... | 1 | ... | ... | ... | 1 | ... | ... | ... | 3 | ... |
| Porters, | 2 | | ... | ... | ... | ... | .. | ... | ... | ... | 2 | ... |
| Potters, | 2 | ... | ... | .. | ... | ... | ... | ... | 1 | ... | 3 | ... |
| Quarriers, | . | . | ... | ... | 1 | 1 | ... | ... | 2 | ... | 3 | 1 |
| Saddlers, | 1 | . | ... | ... | 1 | ... | ... | ... | ... | ... | 2 | ... |
| Sailors, | .. | ... | 2 | ... | 2 | 1 | ... | ... | 4 | ... | 8 | 1 |
| Sawyers, | .. | . | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... |
| Shoemakers, | 3 | 1 | 1 | ... | 1 | 1 | ... | ... | 1 | ... | 6 | 2 |
| Shopkeepers, | ... | ... | ... | ... | ... | ... | ... | ... | 1 | .. | 1 | ... |
| Singers, | ... | ... | .. | ... | 1 | ... | ... | ... | ... | ... | 1 | ... |
| Smiths, | ... | ... | 2 | ... | 4 | 1 | 3 | ... | ... | ... | 9 | 1 |
| Sugar boilers, | ... | .. | ... | ... | ... | ... | ... | .. | 1 | ... | 1 | ... |
| Surgeons, | ... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | 1 | ... |
| Sweeps, | ... | .. | ... | ... | 1 | ... | ... | ... | ... | ... | 1 | ... |
| Tailors, | 1 | ... | 3 | ... | 1 | ... | ... | ... | 4 | ... | 9 | ... |
| Tinsmiths, | 1 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 |
| Tobaccospinners | .. | ... | 1 | 1 | 1 | 1 | ... | ... | ... | ... | 2 | 2 |
| Turners, | ... | ... | ... | ... | 4 | 3 | ... | ... | 1 | ... | 5 | 3 |
| Waiters, | ... | ... | . | ... | ... | ... | ... | ... | 1 | ... | 1 | ... |
| Weavers, | 9 | ... | 1 | ... | 6 | 1 | 3 | ... | 9 | ... | 28 | 1 |
| Unknown, | ... | ... | 1 | 1 | ... | ... | ... | ... | ... | ... | 1 | 1 |
| Total, | 53 | 2 | 21 | 5 | 42 | 16 | 23 | 2 | 66 | 1 | 205 | 26 |

Table X. exhibits the number of females who were afflicted with these five diseases, arranged according to their trades and occupations, distinguishing the deaths.

| Occupations. Females. | Bronchitis. | | Pneumon. | | Phthisis. | | Erysipelas | | Rheumat. | | Totals of each occu. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Case. | Dth. | Case. | Dth. | Case. | Dth. | Case. | Dth. | Case. | Dth. | Case. | Dth. |
| Bleachers, | ... | ... | ... | ... | ... | ... | ... | ... | 4 | ... | 4 | ... |
| Cooks, | ... | ... | ... | ... | .. | ... | ... | ... | 1 | ... | 1 | ... |
| Domestic occup. | 4 | ... | .. | .. | 4 | 2 | 5 | ... | 6 | ... | 19 | 2 |
| Factory women, | 13 | ... | 1 | .. | 10 | 4 | 3 | ... | 8 | ... | 35 | 4 |
| Hawkers, | 1 | .. | ... | ... | ... | ... | ... | ... | ... | .. | 1 | .. |
| Out-door labour. | ... | .. | ... | ... | ... | ... | 1 | 1 | ... | ... | 1 | 1 |
| Potters, | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | ... |
| Servants, | 5 | ... | 1 | ... | 1 | ... | 8 | ... | 9 | ... | 24 | ... |
| Sewers, | 1 | ... | 1 | ... | 7 | 6 | 3 | 1 | 3 | ... | 15 | 7 |
| Washers, | 2 | .. | ... | ... | ... | ... | 1 | ... | 1 | ... | 4 | ... |
| Weavers, | 5 | ... | ... | .. | 6 | 2 | 1 | . | 6 | ... | 18 | 2 |
| Winders, | ... | ... | ... | ... | .. | .. | ... | ... | 3 | ... | 3 | ... |
| No oc. (a child,) | ... | .. | ... | .. | ... | ... | 1 | .. | ... | ... | 1 | ... |
| Total, | 31 | ... | 3 | ... | 28 | 14 | 23 | 2 | 42 | ... | 127 | 16 |

In a city of such dimensions and population as Glasgow, with its numerous manufactories, railways, and extensive shipping arrangements, and situated in the centre of a coal district, it must be evident that the accidents of daily occurrence would, if properly registered, amount in one year to a very considerable number.

The very large number of these cases admitted into the hospital during the past year warranted the conclusion that if some account or classification of them could be given, it would prove in no small degree interesting. This has accordingly been attempted in the table which immediately follows. It may be premised, however, that 433 of these cases were admitted without any other recommendation than the fact that the accidents were of recent occurrence, and the patients brought to the hospital immediately on their receipt. Indeed there are wards denominated "Accident Wards," expressly set apart for the reception of these casualties. In 1844, the numbers admitted under similar circumstances amounted to 351.

Table XI. shows the number of Accidents treated during 1845.

| Causes of the accidents. | Tot. Case. | Dismissed. | | | Died. | | |
|---|---|---|---|---|---|---|---|
| | | M. | F. | Tot. | M | F. | Tot. |
| Assaults, . . | 22 | 4 | 18 | 22 | ... | ... | ... |
| Burns, . . . | 76 | 43 | 27 | 70 | 2 | 4 | 6 |
| Bites from dogs, . . | 2 | ... | 1 | 1 | 1 | ... | 1 |
| Coal-pit accidents, . . | 23 | 19 | ... | 19 | 4 | ... | 4 |
| Cut-throat, . . | 3 | 2 | ... | 2 | 1 | ... | 1 |
| Crushes between walls, stones, vehicles, &c., | 7 | 6 | ... | 6 | 1 | ... | 1 |
| Falls on the ground, . . | 70 | 46 | 21 | 67 | 1 | 2 | 3 |
| Falls down stairs, . | 59 | 25 | 33 | 58 | 1 | ... | 1 |
| Falls from a height, . . | 72 | 51 | 10 | 61 | 6 | 5 | 11 |
| Gun-shot accidents, . | 4 | 4 | ... | 4 | ... | ... | ... |
| Kicks from horses, . . | 6 | 5 | | 5 | 1 | ... | 1 |
| Machinery accidents, . | 61 | 43 | 12 | 55 | 5 | 1 | 6 |
| Railway accidents, . . | 6 | 4 | ... | 4 | 2 | ... | 2 |
| Run over by carts or carriages, . | 28 | 20 | 7 | 27 | 1 | ... | 1 |
| Thrown from carts, carriages, or horses, | 15 | 13 | 1 | 14 | 1 | ... | 1 |
| Thrust arm through a window, . | 1 | ... | 1 | 1 | ... | ... | ... |
| Trod on pieces of glass, . | 2 | 1 | 1 | 2 | ... | ... | ... |
| Weights and heavy articles falling on patients, | 74 | 62 | 4 | 66 | 7 | 1 | 8 |
| Cause of accidents not ascertained, . | 45 | 31 | 6 | 37 | 8 | ... | 8 |
| Totals, . | 576 | 379 | 142 | 521 | 42 | 13 | 55 |

As might a *priori* be expected, the males seem to have been the chief sufferers from these mishaps, their numbers being greater than that of the females in all, of the above heads, with the exception of two. The latter appear to have been assaulted more than the former, but there is, perhaps, reason to fear that in too many instances, their majority has been increased by the outrages of the other sex. Under the head "falls down stairs" the females are also more numerous than the males.

It is worthy of being noted how few railway accidents have been treated, the numbers only amounting to six. This could scarcely have been anticipated, when it is recollected, that in no town in Scotland do more railways centre than in Glasgow, and its immediate vicinity.

The number of machinery accidents happening to females is likewise smaller than would have been expected, when it is remembered how much they are employed in the numerous mills and factories in the city and neighbourhood.

The total mortality per cent. of the accident cases, as calculated from the above data, amounted to 9·5, being for the males 9·9, and for the females 8·3.

The next Table illustrates the nature, and indicates the number of operations performed during the year, 80 of which were rendered necessary in consequence of the accidents enumerated in the preceding Table.

### TABLE XII.—OPERATIONS PERFORMED DURING THE YEAR 1845.

| OPERATIONS. | Tot. | Diseases or injury requiring operation. | Complication, or consequence causing death. | Cured. M. | Cured. F. | Reliev. M. | Reliev. F. | Died. M | Died. F. |
|---|---|---|---|---|---|---|---|---|---|
| Amput. Prim. at shoulder joint, | 3 | 2 Comp. frac.—1 Avulsion, . . | . . . | 3 | | | | | |
| “ “ of arm, . | 3 | Injuries by machinery, . . . | . . | 1 | 1 | | | 1 | |
| “ “ of forearm, . | 2 | Machinery. Comp. fract. . . | . . | 2 | | | | | |
| “ “ at wrist, . | 3 | 2 Avulsion. 1 Laceration, . . | . . | 2 | 1 | | | | |
| “ “ part of hand, | 3 | Compound fracture, . . . | . . . | 2 | 1 | | | | |
| “ “ of fingers, . | 15 | . . . . . . | Tetanus, . . | 12 | 2 | | | 1 | |
| “ “ of thumb, . | 1 | Gunshot wound, . . . . | . . . | 1 | | | | | |
| “ “ of thigh, . | 4 | 3 Compound fracture.—1 Lacer. ham, . | Phlebitis, . . | 2 | 1 | | | 1 | |
| “ “ of leg, . . | 8 | Compound fracture, . . . | Phleb. gang. Del. trem. | 4 | 1 | | | 3 | |
| “ “ of foot, . | 2 | . . . . . . | Tetanus, . | 1 | | | | 1 | |
| “ “ of toes, . | 3 | . . . . . . | Tetanus, . . | 2 | | | | 1 | |
| “ Second. at shoulder joint, | 1 | Extensive burn, . . . . | . . . | 1 | | | | | |
| “ “ of arm, . | 5 | Bite of thumb. Compound fracture, &c. | 3 Phlebitis, . | 2 | | | | 3 | |
| “ “ of fingers, . | 7 | Struma, caries, necr., injury, . . | . . . | 5 | 2 | | | | |
| “ “ of thigh, . | 6 | Open knee joint, osteo-sarcoma, necr. synovitis, &c. | Phlebitis. Aphthæ. | 4 | | | | 1 | 1 |
| “ “ at knee joint, | 1 | Extensive ulcer of leg, . . . . | Phleb. and dis. kidney, | | | | | 1 | |
| “ “ of leg, . . | 5 | Gangrene, necrosis, caries, com. fract. dis. ankle, | 2 Phlebitis, . | 1 | 1 | | | 3 | |
| “ “ at ankle joint, | 1 | Unhealed Chopart's oper., . . . | Phleb. and dis. kidney, | | | | | 1 | |
| “ “ of foot, . | 1 | Caries, . . . . . | . . | | 1 | | | | |
| “ “ of toes, . | 4 | Caries, gangrene, . . . . | . . | 2 | 1 | | | 1 | |
| “ “ of penis, . | 1 | Cancer, . . . . . | . . | 1 | | | | | |
| Excision of lip, . . . | 5 | Cancer, . . . . . | . . . | 5 | | | | | |
| “ of mamma, . . | 7 | Scirrhus, hydatids, . . . | . . | | 7 | | | | |
| “ of patella, . . | 1 | Compound fracture, . . . | Phlebitis, . | | | | | | 1 |
| “ of testis, . | 1 | Struma, . . . . . | . . . | 1 | | | | | |

## TABLE XII.—OPERATIONS PERFORMED DURING THE YEAR 1845.—*Continued.*

| OPERATIONS. | Tot. | Disease or injury requiring operation. | Complication, or consequence causing death. | Cured. |  | Reliev. |  | Died. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | M. | F. | M. | F |  | F. |
| Excision of upper jaw, | 1 | Fungus hæmatodes, |  |  |  | 1 |  |  |  |
| " part of upper jaw, | 1 | Fibrous tumour, |  | 1 |  |  |  |  |  |
| " " of lower jaw, | 1 | Fungus, |  | 1 |  |  |  |  |  |
| " of schirrus ani, | 1 |  |  |  |  | 1 |  |  |  |
| Extirpation of Bursa, | 1 | Bunion, |  |  | 1 |  |  |  |  |
| " of calculus preputii, | 1 | Phymosis, |  | 1 |  |  |  |  |  |
| " of nasal polypi, | 3 |  |  | 1 | 2 |  |  |  |  |
| " of steatomata, | 3 |  |  | 1 | 2 |  |  |  |  |
| " of molluscum, | 1 |  |  |  | 1 |  |  |  |  |
| Section of anal fistulæ, | 11 |  |  | 10 | 1 |  |  |  |  |
| " subcutaneous, | 1 | Burn, |  |  |  |  | 1 |  |  |
| " of prepuce from glans penis | 1 | Congenital adhesion, |  | 1 |  |  |  |  |  |
| " of tendons, | 2 | Talipes varus, |  | 1 | 1 |  |  |  |  |
| " of tunica vagin. testis, | 2 | Hydrocele, |  | 2 |  |  |  |  |  |
| Reduction of hernia by taxis, | 1 | Strang. scrotal, |  | 1 |  |  |  |  |  |
| " of hernia by oper. | 1 | Strang. inguinal, |  | 1 |  |  |  |  |  |
| * " of scapulæ, | 4 | Dislocation, |  | 4 |  |  |  |  |  |
| " of humerus, | 14 | " |  | 13 | 1 |  |  |  |  |
| " of radius, | 1 | " |  | 1 |  |  |  |  |  |
| " of ulna, | 1 | " |  | 1 |  |  |  |  |  |
| " of radius and ulna, | 2 | " |  | 1 | 1 |  |  |  |  |
| " of thumb, | 1 | " middle phalanx, |  |  | 1 |  |  |  |  |
| " of femur, | 2 | " into sciatic notch, |  | 2 |  |  |  |  |  |
| " of foot, | 2 | " |  | 1 | 1 |  |  |  |  |
| Ligature of femoral artery, | 2 | Popliteal aneurism, |  | 2 |  |  |  |  |  |
| " of varicose veins, | 1 |  |  | 1 |  |  |  |  |  |

* The greater number of the cases of dislocation had no residence in the Infirmary, and consequently they do not appear among the numbers in Table II. System IX.

## TABLE XII.—OPERATIONS PERFORMED DURING THE YEAR 1845.—*Continued.*

| OPERATIONS. | Tot. | Disease or injury requiring operation. | Complication, or consequence causing death, | Cured. |  | Reliev. |  | Died. |  |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  | M. | F. | M. | F. | M | F. |
| Ligature of nævus maternus, | 1 | . . . . . | . . . |  | 1 |  |  |  |  |
| Rhinoplastic operation, . | 1 | Ozena, . . . . . | . . . |  | 1 |  |  |  |  |
| Harelip " . | 3 | . . . . . | . . . | 3 |  |  |  |  |  |
| Syme's " . | 2 | Fungus testis, . . . | . . . | 2 |  |  |  |  |  |
| Hydrocele, . . . . . | 5 | 2 Tapped.—3 Injected, . | . . . | 4 |  | 1 |  |  |  |
| Urethrotomy, . . . . | 5 | Calculus, ruptured urethra, . . | Fract. Pelvis, . | 4 |  |  |  | 1 |  |
| Lithotomy, . . . . | 1 | Calculus in vesica, . . | . . . | 1 |  |  |  |  |  |
| Trephine, . . . . . | 1 | Compound fracture, . . | . . . |  |  |  |  |  | 1 |
| Cauterization, . . | 1 | Vesico-vaginal fistula, . . . | . . . |  |  |  | 1 |  |  |
|  | 175 |  |  | 115 | 33 | 3 | 2 | 19 | 3 |

## II.—STATISTICS OF THE FEVER WARDS.

There were in the fever wards on the 1st of January 1845, 37 patients; during the year there were admitted 528; and there remained on the 31st of December 30; the whole cases treated to a termination, therefore, amounted to 535. Of these 300 were males, of whom 47 or 1 in 6·4 died; and 235 were females, of whom 28 or 1 in 8·4 died.

Of these 535 patients there were

| | Scotch. | Irish. | English. | Foreigners. | Total. |
|---|---|---|---|---|---|
| Males, | 183 | 105 | 10 | 2 | 300 |
| Females, | 149 | 84 | 2 | ... | 235 |
| | 332 | 189 | 12 | 2 | 535 |

From this it appears that of the above number of patients 62·05 per cent. belonged to Scotland, 35·32 per cent. to Ireland, 2·24 per cent. to England, and 0·37 per cent. to foreign countries. On comparing these results with those already given for the patients treated in the medical and surgical wards, the Irish seem to have suffered from fever in a ratio of about 10 per cent. more than they have from other diseases; while, on the other hand, the Scotch have suffered less from it than from other diseases, by nearly the same per centage. Notwithstanding this, however, the mortality for the natives of both countries is very nearly alike; 46 Scotch having died and 27 Irish, the mortality per cent. being for the former 13·85, and for the latter 14·28. Two English died out of the 12 treated.

The following per centages, given by the late Dr Cowan in his Statistics,* may be compared with the preceding. Of 2513 patients treated by him in the Glasgow Fever Hospital during the years 1835–6, 67·76 per cent. were Scotch, 30·12 per cent. were Irish, and 2·10 per cent. were English, including 13 foreigners and those born in the colonies of Great Britain. The mortality of the Scotch and Irish was precisely the same in his cases. The per centage is, however, unfortunately not indicated.

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* Vital Statistics of Glasgow. By Robert Cowan, M. D., one of the Physicians to the Glasgow Royal Infirmary. Glasgow, 1838, pages 16 and 24.

Table XIII. is a numerical analysis of the admissions, dismissions, deaths, average numbers, and mortality per cent. of the cases treated in the fever wards during the year 1845 for each month in the year.

| Fever Wards. | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1845. | Admitted. | | | Dismissed. | | | Died. | | | Av. No in Hosp. | | | Mortality per cent. | | |
| | Tot | M. | F. | Tot | M. | F. | T. | M | F. | T. | M | F | Tot. | M. | F. |
| January, . | 62 | 36 | 26 | 57 | 28 | 29 | 12 | 7 | 5 | 36 | 19 | 17 | 17·3 | 20· | 14·7 |
| February, . | 48 | 26 | 22 | 43 | 23 | 20 | 10 | 5 | 5 | 29 | 15 | 14 | 18·8 | 17·8 | 20· |
| March, . | 36 | 20 | 16 | 34 | 22 | 12 | 6 | 3 | 3 | 18 | 10 | 8 | 15· | 12· | 20· |
| April, . | 41 | 29 | 12 | 33 | 20 | 13 | 6 | 4 | 2 | 23 | 14 | 9 | 15·3 | 16·6 | 13·3 |
| May, . | 38 | 19 | 19 | 36 | 25 | 11 | 5 | 3 | 2 | 18 | 9 | 9 | 12·1 | 10·7 | 15·3 |
| June, . | 38 | 24 | 14 | 23 | 7 | 16 | 8 | 6 | 2 | 17 | 7 | 10 | 25·8 | 46·1 | 11·1 |
| July, . | 21 | 8 | 13 | 39 | 20 | 19 | 1 | 1 | ... | 17 | 7 | 10 | 2·5 | 4·7 | ... |
| August, . | 45 | 22 | 23 | 20 | 10 | 10 | 3 | 2 | 1 | 17 | 9 | 8 | 13· | 16·6 | 9· |
| September, . | 44 | 21 | 23 | 41 | 22 | 19 | 2 | 1 | 1 | 26 | 12 | 14 | 4·6 | 4·3 | 5· |
| October, . | 57 | 31 | 26 | 52 | 20 | 26 | 6 | 4 | 2 | 34 | 15 | 19 | 10·3 | 13·3 | 7·1 |
| November, . | 52 | 33 | 19 | 38 | 21 | 17 | 9 | 5 | 4 | 34 | 16 | 18 | 19·1 | 19·2 | 19· |
| December, . | 46 | 29 | 17 | 44 | 29 | 15 | 7 | 6 | 1 | 31 | 20 | 11 | 13·7 | 17·1 | 6·2 |
| Total, . | 528 | 298 | 230 | 460 | 253 | 207 | 75 | 47 | 28 | 25 | 13 | 12 | 14· | 15·6 | 11·9 |

The following is a specification of the diseases with which the patients treated in the fever wards were affected.

Table XIV.

| Diseases. | Total Cases. | Cured. | Dismis. from oth. causes. | Died. |
|---|---|---|---|---|
| Common continued fever, . | 116 | 109 | ... | 7 |
| Continued fever with relapse, of 1843–4 | 37 | 36 | ... | 1 |
| Typhus fever, . . | 266 | 215 | .. | 51 |
| Febricula, . . . . | 29 | 29 | ... | .. |
| Fever, sequelæ of, . . | 1 | | ... | .. |
| Rubeola, . . . . | 7 | 7 | ... | ... |
| Scarlatina, . . | 11 | 11 | .. | ... |
| Variola, . . . . | 22 | 18 | ... | 4 |
| Varicella, . . . . | 2 | 2 | ... | .. |
| Bowels, ulceration of, . . | 1 | ... | ... | 1 |
| Bronchitis, . . . | 10 | 8 | 1 | |
| Catarrh, . . . | 3 | 3 | ... | ... |
| Debility, . . . . | 1 | 1 | ... | ... |
| Delirium tremens, . . | 3 | 2 | ... | 1 |
| Kidneys, disease of, . . | 1 | ... | ... | 1 |
| Mania, . . . . | 2 | ... | 1 | 1 |
| Meningitis, . . . | 1 | ... | ... | 1 |
| Moribund, . . . . | 2 | ... | ... | 2 |
| Pericarditis, . . | 1 | 1 | | ... |
| Phthisis, . . . . | 2 | ... | 1 | 1 |
| Pleuritis, . . . | 4 | 3 | 1 | ... |
| Pleuro-pneumonia, . . | 2 | 1 | ... | 1 |
| Pneumonia, . . . | 5 | 3 | ... | 2 |
| Pregnancy, . . . . | 1 | ... | 1 | ... |
| Rheumatism, . . . | 3 | 3 | ... | ... |
| Syphilis, . . . . | 1 | ... | 1 | ... |
| Tic-douloureux, . . | 1 | ... | 1 | ... |
| Total, . . | 535 | 453 | 7 | 75 |

The year 1845 was characterized in Glasgow by the remarkably small number of fever cases which prevailed; and as a consequence the numbers sent to the hospital were proportionally few, fewer indeed, as will be afterwards satisfactorily shown, than in any previous year since the foundation of the fever hospital. On two successive days, namely, the 30th and 31st of July, the numbers in the fever wards were so low as 8, while on the 5th and 8th of January, and 25th of October, they amounted to no more than 42, which was the greatest number in hospital on any single day.

It is here worthy of remark also, that a very large proportion, (more than a third,) of the cases treated were brought from the neighbouring country and suburban districts, so that the city itself may be said to have enjoyed a remarkable immunity from fever, more so than has been known for many years. A reference to Table XIX. will fully illustrate this point. How it is to be accounted for is not easy to say, unless it can be supposed to result from the prosperous state of trade during the whole year, and the consequent full employment of the industrious poor. Perhaps also the occurrence of the late epidemic which so extensively prevailed in the city about a year and a half ago, may have had some share in conferring this comparative immunity, though at the same time it must be confessed that it bore no resemblance to the fever which commonly prevails in Glasgow, and, as was stated in former year's statistics,* the having been attacked by one of these forms was no guarantee of exemption from the other.

It must not, however, be omitted to be mentioned, that though the cases were so few in number, still they were of a very severe nature, and the mortality consequently was high. This, as will immediately be seen, was mainly attributable to the malignancy of the typhus cases.

From Table XIII. it appears that the total mortality was as high as 14 per cent., being for the males above 15½ per cent., and for the females nearly 12 per cent. It is not a little curious to observe that the month of June in 1845, as in the former year, was the most fatal month in the year, the total mortality being above 25 per cent.: that for the males being 46 per cent., while for the females it was 11 per cent.; and what renders this coincidence still more striking, is the fact, that during the succeeding month, July, the mortality was lowest in both years, with the exception of the months of January and March in 1844, at which periods it was influenced by the epidemic which was then still in existence, and its mortality, as is well known, was very low.

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* Edin. Med. and Surg. Journ., vol. lxiii. p. 399.

Table XV. presents a view of the three principal forms of Fever treated during the year 1845, showing the numbers dismissed and dead.

| 1845. | Epidemic fever of 1843–4. | | | | | Common continued fever. | | | | | Typhus fever. | | | | | Mortality per cent. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total. | Cur. | | Died | | Total. | Cur. | | Died | | Total. | Cur. | | Died. | | Epidem. cases | Com cont. cases | Typ. cases |
| | M.& F. | M | F. | M | F | M.& F. | M | F | M | F | M.& F. | M. | F. | M | F. | | | |
| Jan. | 3 | 1 | 2 | ... | ... | 16 | 6 | 9 | ... | 1 | 38 | 19 | 11 | 6 | 2 | ... | 6·2 | 21· |
| Feb. | 3 | 1 | 2 | ... | ... | 11 | 4 | 7 | ... | ... | 29 | 14 | 8 | 4 | 3 | .. | ... | 24·1 |
| March, | ... | ... | ... | ... | ... | 5 | 3 | 2 | ... | ... | 29 | 16 | 8 | 2 | 3 | ... | ... | 17·2 |
| April, | ... | ... | ... | ... | ... | 8 | 6 | 1 | 1 | ... | 20 | 8 | 7 | 3 | 2 | . | 12·5 | 25· |
| May, | 1 | 1 | ... | ... | ... | 5 | 2 | 3 | ... | ... | 24 | 13 | 7 | 2 | 2 | ... | ... | 16·6 |
| June, | ... | ... | ... | ... | . | 4 | 1 | 2 | 1 | ... | 16 | 4 | 8 | 3 | 1 | ... | 25· | 25· |
| July, | ... | .. | | ... | ... | 4 | 3 | 1 | ... | ... | 29 | 16 | 12 | 1 | ... | ... | ... | 3·4 |
| Aug. | ... | ... | ... | ... | ... | 3 | 1 | 2 | ... | ... | 12 | 4 | 5 | 2 | 1 | ... | ... | 25· |
| Sept. | 10 | 4 | 5 | ... | 1 | 11 | 7 | 4 | ... | ... | 17 | 8 | 8 | 1 | ... | 10· | ... | 5·8 |
| Oct. | 14 | 8 | 6 | ... | ... | 24 | 12 | 11 | 1 | ... | 11 | 2 | 5 | 2 | 2 | ... | 4·1 | 36·3 |
| Nov. | 3 | 3 | ... | ... | ... | 12 | 6 | 4 | 1 | 1 | 18 | 7 | 6 | 2 | 3 | ... | 16·6 | 27·7 |
| Dec. | 3 | 3 | ... | ... | ... | 13 | 6 | 6 | ... | 1 | 23 | 12 | 7 | 4 | ... | ... | 7·6 | 17·3 |
| Total, | 37 | 21 | 15 | ... | 1 | 116 | 57 | 52 | 4 | 3 | 266 | 123 | 92 | 32 | 19 | 2·7 | 6· | 19·1 |

The occurrence of cases of a precisely similar nature as the epidemic of 1843–4 during the year 1845, after it was thought fully to have terminated, was not a little surprising; and as every particular connected with that peculiar disease must be in some degree interesting, a space has been devoted to it in the above table.

There were in all 37 cases, and these all had the relapse, and other characteristic symptoms of the epidemic, in short, were distinct and well marked cases of the disease. During the month of September the greatest number were admitted; indeed, so striking did it appear, that it could have been supposed another visitation of the epidemic threatened the city. The greater proportion of the patients left the hospital during September and October, but a few sporadic cases still sometimes occur. Only one patient, a female, died, after sixteen days residence, and her case was complicated with erysipelas and peritonitis.

There is nothing with regard to the cases of common continued fever calling for particular observation here. The high mortality of the typhus cases is most clearly demonstrated in the above table. A farther analysis of these two latter forms of fever will now be given, the ages of the patients being selected as the ground-work of the tabular arrangement. It ought, in explanation, to be mentioned, however, that the column showing the mortality per cent. at each age of the whole number of deaths, as given in the former year's tables, has here been omitted on account of the small number of cases that occurred.

**Table XVI.** shows the number of cases of Common Continued Fever, with the mortality, &c. distinguishing the sexes, and arranged according to the ages of the patients.

| 1845. | Total Cases. | Cured. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Aver. resid. of the cases that died in days. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M.& F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | 2 | 1 | 1 | .. | . | ... | ... | ... | 14 | 7 | 21 | ... | ... | ... |
| 10 to 15 | 5 | 1 | 4 | ... | ... | ... | ... | ... | 20 | 28 | 12 | ... | ... | ... |
| 15 to 20 | 34 | 13 | 20 | 1 | . . | 2·9 | 7·1 | ... | 14 | 12 | 16 | 7 | 7 | ... |
| 20 to 30 | 49 | 25 | 22 | ... | 2 | 4· | . . | 8·3 | 18 | 18 | 18 | 6 | .. | 6 |
| 30 to 40 | 15 | 12 | 2 | 1 | ... | 6·6 | 7·6 | ... | 10 | 13 | 8 | 4 | 4 | ... |
| 40 to 50 | 7 | 4 | 2 | . . | 1 | 14·2 | . . | 33·3 | 11 | 9 | 13 | 3 | ... | 3 |
| 50 to 60 | 1 | 1 | .. | ... | ... | ... | ... | ... | 31 | 31 | ... | ... | ... | ... |
| above 60 | 3 | ... | 1 | | ... | 66·6 | 100· | ... | 8 | 4 | 13 | 4 | 4 | ... |
| Total, | 116 | 57 | 52 | 4 | 3 | 6· | 6·5 | 5·4 | 15 | 15 | 16 | 5 | 4 | 5 |

Ten of the cases in the preceding table were complicated with the following diseases.

One female, aged between 20 and 30, died after three days' residence, from cerebral complication.

Two males had pleuritis, one of whom, from 20 to 30, residence 11 days, recovered, the other above 60, died after a residence of three days.

One female, from 15 to 20, had pneumonia, from which she recovered after 41 days' residence. Another female, between 20 and 30, died after 10 days' residence, in whom there was found gangrene and pneumonic abscess of the lung.

One male, from 20 to 30, recovered after having had enteritic complication, which prolonged his residence to 46 days. One male, from 30 to 40, residence 18 days, had jaundice, and another, between 50 to 60, residence 31 days, had rheumatism; these both recovered.

One female, from 15 to 20, residence 18 days, had parotitis, and another, between 20 and 30, had tonsillitis; these also both recovered.

The deaths from this form of fever occurred as follows:

One male died on the 7th day from seizure; one female on the 8th; one male on the 10th; one male on the 15th; one female on the 17th; and one female on the 31st. The date of seizure was not ascertained in the case of one male, who was so weak as to be unable to give any account of himself.

Table XVII.—Shows the number of cases of Typhus Fever, with the mortality, &c., distinguishing the sexes, and arranged according to the ages of the patients.

| 1845. | Total Cases. | Cured. | | Died. | | Mortality per cent. | | | Average residence in days. | | | Aver. resi. of the cases that died in days. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ages. | M.& F. | M. | F. | M. | F. | Tot. | M. | F. | Tot. | M. | F. | Tot. | M. | F. |
| 1 to 10 | 12 | 7 | 3 | 2 | ... | 16·6 | 22·2 | ... | 21 | 23 | 16 | 8 | 8 | ... |
| 10 to 15 | 24 | 14 | 8 | 1 | 1 | 8·3 | 6·6 | 11·1 | 18 | 17 | 18 | 6 | 3 | 9 |
| 15 to 20 | 45 | 24 | 14 | 4 | 3 | 15·5 | 14·2 | 17·6 | 19 | 16 | 24 | 9 | 7 | 12 |
| 20 to 30 | 96 | 41 | 42 | 8 | 5 | 13·5 | 16·3 | 10·6 | 19 | 16 | 22 | 6 | 4 | 9 |
| 30 to 40 | 45 | 19 | 18 | 7 | 1 | 17·7 | 26·9 | 5·2 | 18 | 15 | 22 | 6 | 5 | 9 |
| 40 to 50 | 34 | 13 | 7 | 7 | 7 | 41·1 | 35· | 50· | 15 | 13 | 17 | 9 | 8 | 11 |
| 50 to 60 | 7 | 3 | ... | 2 | 2 | 57·1 | 40· | 100· | 12 | 16 | 4 | 4 | 4 | 4 |
| Above 60 | 3 | 2 | ... | 1 | ... | 33·3 | 33·3 | ... | 34 | 34 | ... | 5 | 5 | ... |
| Total, | 266 | 123 | 92 | 32 | 19 | 19·1 | 20·6 | 17·1 | 18 | 16 | 21 | 7 | 6 | 9 |

Fourteen of the cases in the above table were reported as complicated with other affections.

There appears to have been only one case of pneumonia, which occurred in a male, from 40 to 50 years of age, who died after being 32 days in the house.

One female, between 20 and 30, had pleuritis, and being pregnant, abortion took place; she died after 13 days' residence.

One male, from 15 to 20, residence 12 days, one female, from 15 to 20, and another, from 20 to 30, residence of each 11 days, had dothinenteritis, and all three died. One male, from 10 to 15, died of peritonitis after 3 days' residence. Two males, from 20 to 30, average residence 46 days, had melæna, from which they recovered.

In a female, from 15 to 20, the disease was followed by variola, but after a residence of 76 days she recovered.

In four cases erysipelas occurred. One, a female, between 40 and 50, died after 21 days' residence. One male, from 20 to 30, and two others, from 30 to 40, average residence 44 days, recovered.

An old man above 60 had gangrene of the toes, but recovered after 86 days' residence in the hospital.

Table XVIII.—Of the deaths occurring from Typhus, there happened,

| After seizure. | M. | F. | Tot. | After seizure. | M. | F. | Tot. |
|---|---|---|---|---|---|---|---|
| On the 8th day | 2 | — | 2 | 21st day | 1 | 1 | 2 |
| 9th . | 2 | — | 2 | 22d . | — | 1 | 1 |
| 11th . | 6 | 2 | 8 | 23d . | — | 1 | 1 |
| 12th | 3 | — | 3 | 24th . | — | 1 | 1 |
| 13th . | 1 | 2 | 3 | 25th . | 1 | — | 1 |
| 14th . | 5 | — | 5 | 28th . | — | 1 | 1 |
| 15th . | 1 | 1 | 2 | 37th . | 1 | — | 1 |
| 16th . | 1 | — | 1 | Date of seizure unknown in | 4 | 3 | 7 |
| 17th . | 1 | 2 | 3 | | | | |
| 19th . | 1 | 2 | 3 | | — | — | — |
| 20th . | 2 | 2 | 4 | | 32 | 19 | 51 |

Table XIX.—Showing the Districts from which the patients treated in the Fever Wards during 1845 were brought.

| From City Districts. | Total. | Cured. | Died. | Sub. and Extremit. of City. | Total. | Cured. | Died. | From Country Villages. | Total. | Cured. | Died. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| No. 1, | 13 | 10 | 3 | Bridgeton, | 33 | 25 | 8 | Partick, | 4 | 3 | 1 |
| 2, | 22 | 22 | | Mile-End, | 3 | 3 | | Finnieston, | 4 | 4 | |
| 3, | 18 | 17 | 1 | Calton, | 65 | 57 | 8 | Govan, | 1 | 1 | |
| 4, | 11 | 11 | | Springbank, | 2 | 2 | | Pollokshaws, | 4 | 4 | |
| 5, | 4 | 4 | | Blackquarry, | 4 | 4 | | Neilston, | 9 | 8 | 1 |
| 6, | 10 | 8 | 2 | Port-Dundas, | 10 | 9 | 1 | Houston, | 2 | 2 | |
| 7, | 23 | 18 | 5 | Cowcaddens, | 12 | 12 | | Duntocher, | 2 | 2 | |
| 8, | 3 | 3 | | Anderston, | 16 | 10 | 6 | Maryhill, | 2 | 2 | |
| 9, | 15 | 12 | 3 | Woodside Crescent, | 2 | 2 | | Kilsyth, | 1 | 1 | |
| 10, | 4 | 2 | 2 | | | | | Campsie, | 3 | 1 | 2 |
| 11, | 15 | 14 | 1 | | 147 | 124 | 23 | Balfron, | 1 | 1 | |
| 12, | 13 | 12 | 1 | | | | | Eaglesham, | 1 | 1 | |
| 13, | 22 | 21 | 1 | | | | | Lanark, | 1 | 1 | |
| 14, | 12 | 8 | 4 | FROM SOUTH SIDE OF THE RIVER. | | | | Mearns, | 1 | 1 | |
| 15, | 36 | 32 | 4 | | | | | Killermont, | 2 | 1 | 1 |
| 16, | 5 | 4 | 1 | | | | | Hogganfield, | 1 | 1 | |
| 17, | 2 | 2 | | Tradeston, | 15 | 12 | 3 | Garnkirk, | 2 | 2 | |
| | | | | Laurieston, | 8 | 6 | 2 | Dundyvan, | 2 | 2 | |
| | 228 | 200 | 28 | Gorbals, | 18 | 13 | 5 | Daviesdykes, | 2 | 2 | |
| | | | | Hutchesontown, | 7 | 7 | | Coatbridge, | 3 | 3 | |
| | | | | | | | | Kirkintilloch | 2 | 2 | |
| FROM THE SEVERAL PUBLIC INSTITUTIONS. | | | | | 48 | 38 | 10 | Summerlie, | 1 | 1 | |
| | | | | | | | | Airdrie, | 3 | 1 | 2 |
| | | | | | | | | Gartsherrie, | 1 | 1 | |
| Town's Hospital, | 4 | 3 | 1 | | | | | Meadowburn, | 1 | 1 | |
| Night Asylum, | 4 | 3 | 1 | TOTAL. | | | | Parkhead, | 3 | 2 | 1 |
| Police Office and Houseless, | 17 | 17 | | City Districts, | 228 | 200 | 28 | Camlachie, | 5 | 4 | 1 |
| Orphan Institution, | 1 | 1 | | Public Institutions, | 42 | 37 | 5 | Springburn, | 2 | 2 | |
| Female House of Refuge, | 3 | 3 | | Suburbs and Extremities of City, | 147 | 124 | 23 | Provan Mills, | 1 | 1 | |
| Lock Hospital, | 2 | 1 | 1 | | | | | Kippock, | 1 | 1 | |
| Medical and Surgical Wards of Infirmary, | 11 | 9 | 2 | South side of River, | 48 | 38 | 10 | Busbie, | 1 | 1 | |
| | | | | Country Villages, | 70 | 61 | 9 | Kelvinhaugh, | 1 | 1 | |
| | 42 | 37 | 5 | | 535 | 460 | 75 | | 70 | 61 | 9 |

As an appropriate appendix to the statistics of fever, I have compiled the following comprehensive table from the Annual Reports of the Infirmary. It presents a view of the whole of the cases treated in the Glasgow Fever Hospital since its opening, which took place in the month of April 1829, up to the close of the year 1845, embracing a period of 17 years.

Table XX.—Exhibiting the number of cases treated in the Glasgow Fever Hospital from the year 1829 to the year 1845 inclusive, with the mortality per cent. and ratio per cent. to the population, showing also the numbers cured and dead.

| Population of Glasgow. | Years. | Total Cases. | | | Cures. | | | Deaths. | | | Mortality per cent. | | | Ratio per cent. to population of cases treated. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total. | Males. | Fems. | Total. | Males. | Fems. | Total. | Males. | Fems. | Total. | Males. | Fems. | Males. | Females. |
| Census of 1831. | 1829 | 865 | ... | ... | 769 | ... | ... | 96 | ... | ... | 11. | .. | ... | ... | ... |
| Males, 93,724 | 1830 | 729 | ... | ... | 648 | ... | ... | 81 | ... | ... | 11.1 | ... | ... | ... | ... |
| Females, 108,702 | 1831 | 1657 | 750 | 907 | 1513 | 677 | 836 | 144 | 73 | 71 | 8.7 | 9.7 | 7.8 | 0.80 | 0.83 |
| | 1832 | 1589 | 730 | 859 | 1436 | 641 | 795 | 153 | 89 | 64 | 9.6 | 12.1 | 7.4 | 0.74 | 0.76 |
| Total, 202,426 | 1833 | 1288 | 618 | 670 | 1144 | 543 | 601 | 144 | 75 | 69 | 11.1 | 12.1 | 10.2 | 0.60 | 0.57 |
| | 1834 | 2003 | 972 | 1031 | 1827 | 880 | 947 | 176 | 92 | 84 | 8.7 | 9.4 | 8.1 | 0.91 | 0.85 |
| | 1835 | 1359 | 643 | 716 | 1215 | 566 | 649 | 144 | 77 | 67 | 10.5 | 11.9 | 9.3 | 0.58 | 0.57 |
| | 1836 | 3125 | 1583 | 1542 | 2627 | 1296 | 1331 | 498 | 287 | 211 | 15.9 | 18.1 | 13.6 | 1.38 | 1.20 |
| | 1837 | 5387 | 2525 | 2862 | 4699 | 2107 | 2592 | 688 | 418 | 270 | 12.7 | 16.5 | 9.4 | 2.14 | 2.16 |
| | 1838 | 2047 | 1010 | 1037 | 1816 | 883 | 983 | 231 | 127 | 104 | 11.2 | 12.5 | 10. | 0.82 | 0.76 |
| Census of 1841. | 1839 | 1529 | 794 | 735 | 1276 | 663 | 613 | 253 | 131 | 122 | 16.5 | 16.4 | 16.6 | 0.63 | 0.52 |
| Males, 134,087 | 1840 | 3385 | 1713 | 1672 | 2937 | 1458 | 1479 | 448 | 255 | 193 | 13.2 | 14.8 | 11.5 | 1.31 | 1.16 |
| Females, 148,047 | 1841 | 2578 | 1277 | 1301 | 2313 | 1121 | 1192 | 265 | 156 | 109 | 10.2 | 12.2 | 8.3 | 0.95 | 0.87 |
| | 1842 | 1194 | 583 | 611 | 1069 | 514 | 555 | 125 | 69 | 56 | 10.4 | 11.8 | 9.1 | 0.42 | 0.40 |
| Total, 282,134 | 1843 | 3553 | 1596 | 1957 | 3374 | 1495 | 1879 | 179 | 101 | 78 | 5. | 6.3 | 8.9 | 1.12 | 1.25 |
| | 1844 | 1468 | 769 | 699 | 1325 | 687 | 638 | 143 | 82 | 61 | 9.7 | 10.6 | 8.7 | 0.52 | 0.43 |
| | 1845 | 535 | 300 | 235 | 460 | 253 | 207 | 75 | 47 | 28 | 14. | 15.6 | 11.9 | 0.19 | 0.14 |
| Total for 15 years, | | 32697 | 15863 | 16834 | 29031 | 13784 | 15247 | 3666 | 2079 | 1587 | 11.21 | 13.10 | 9.42 | 0.87 | 0.83 |
| Total for 17 years, | | 34291 | ... | ... | 30448 | ... | ... | 3843 | ... | ... | 11.20 | ... | ... | ... | .. |

From the above table, it appears that during the last seventeen years, the whole number of cases treated in the fever hospital amounted to 34,291, the cures being 30,448, and the deaths 3843; the mortality as calculated from these data was 11·20 per cent. or about one in nine.

It is to be regretted that, in the years 1829–30, the distinction between the sexes has not been preserved in the annual reports of the hospital for these years, and consequently the total columns have alone been filled up. It appears, however, that, during the fifteen years in which the sexes have been accurately distinguished, 13,784 males, and 15,247 females have been cured; 2079 males and 1587 females have died, the mortality per cent. being for the males 13·10 and for the females 9·42. During these years also it is worthy of attention, that the mortality was, with one exception, uniformly greater among the males than among the females. This accords with the general history of fever as deduced from statistical inquiries, and has been variously explained. The exception alluded to was in the year 1839, in which the total mortality for both sexes was 16½ per cent. being considerably higher than in any former year, and on comparing that of the two sexes it is found to be somewhat greater in the females. The mortality was lowest during the prevalence of the late epidemic in 1843, when it was no more than 5 per cent.

During the year 1837 the largest number was treated, but it should be observed that 906 cases are included in the number for that year, which were treated in an auxiliary hospital opened for males only, in the month of March, and of whom 129 died. The smallest number treated was, as has already been mentioned, in 1845.

From the data contained in the above table, the annual average number of cases treated in the fever hospital during the last seventeen years, is found to be 2017, the cures being 1791, and the deaths 226.

A question of considerable interest here naturally presents itself,—whether does fever affect males or females in the greatest proportion, *cæteris paribus?* Dr Davidson* of this city, writing on the sources and mode of propagation of the continued fevers of Great Britain and Ireland, remarks, "Although the comparative frequency of fever among the sexes has not been accurately determined, it has been proved satisfactorily, by the statistics of almost every large hospital, that a larger per cent. of male than of female patients die of the disease; and it is proved by the Glasgow mortality bills that a much greater number of the male than of the female population of that city are carried off by it." This question, then, it would appear, is as yet undetermined. Do the results obtained from the preceding table afford any data which may assist in its solution?

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* Thackeray Prize Essay, p. 61. (1841.)

From this table it appears that the number of females actually treated in the hospital during the last fifteen years exceeded that of the males by 971 cases, but it must be recollected that the female population, as ascertained at the census of 1831, was to the male as 116 to 100, while for 1841 it was as 110 to 100. In investigating this point, therefore, it is necessary to ascertain the ratio per cent. of the cases treated to the male and female population respectively; and I have here to express my acknowledgements to Dr Watt, who kindly pointed out to me the method on which I have proceeded.

To attain this object, it was requisite to find the increase which takes place annually in the population, distinguishing the sexes. This is done by subtracting the population of each sex, as obtained by the census of 1831, from that of 1841, which gives the increase for ten years. The tenth part of this affords as near an approximation to the annual increase as can by possibility be obtained, and it is sufficiently accurate for the purpose I have in view here. Having obtained the annual increase, the ratio per cent. to the male and female population is easily calculated. This annual increase may here be stated. It was for the males from 1831 to 1841, 4036; for the females 3934; and for both sexes, 7970.

On comparing the ratios as given in the preceding table, they are found to be higher in the male than in the female cases, for every year, with the exception of the years 1831–32–37, and 1843; and on taking the average for the fifteen years, the ratio is 0·87 for males, and 0·83 for females.

These results may be stated in other words as follows. The cases treated in the Glasgow fever hospital during the last fifteen years have been in the proportion of one to every 115 of the male population, and of one to every 120 of the female population, being 2 out of every 235 individuals. Males, therefore, in Glasgow at least, seem to be affected with fever in a somewhat greater proportion than females; the difference, however, is but very trifling.

The only question that I am at present aware of, that can at all interfere with the accuracy of these results, may be put in the following manner,—Are the numbers of females treated at their own houses greater than those of the males? I have no reason to believe that it is so in Glasgow, and I regret that I have no data from which I can speak confidently on the subject. Be this as it may, however, the above facts show that the liability of the sexes to fever approximates very closely; and even should it at some future period be found that the proportion of the female population of Glasgow treated at home is greater than that of the other sex, this circumstance will only tend to render the approximation still closer.

Another point of interest which may be gleaned from the preceding table, and to which, in conclusion, I would for a moment advert, is the regularity with which the numbers treated seemed to rise every third year. If we compare the years 1831, 1834, 1837, 1840, and 1843, the numbers for these years appear to have attained as it were a maximum, and during the two intervening years to have declined very considerably. Should this triennial exacerbation, as it may be called, continue, then the present year 1846 may be expected to be attended with a considerable increase of admissions to the fever hospital; and I think the numbers sent to an hospital may be considered as as a pretty certain index of the extent and prevalence of fever in a town or city.

Several of the most distinguished of the profession, who have been close observers of the epidemics of fever which periodically attack the inhabitants of the cities of Edinburgh and Glasgow, have recorded it as their experience that these visitations take place at intervals of about ten years, each epidemic continuing from two to three years, and this they have satisfactorily proved.

From the history of the past, there can be little doubt that the principal cause of the epidemic prevalence of disease in these two cities is attributable to the great amount of destitution, from whatever cause produced, which so notoriously prevails among the lower classes in both, and which has hitherto kept pace in a steadily increasing ratio with that of the population. To show that this is the case in Glasgow I may quote the following words of Dr Alison :* " For twenty years before 1815, when the town was rapidly increasing in wealth, the number of fever patients in the infirmary never exceeded 130 in the year. In the three years 1817, 1818, and 1819, it amounted to 2715, or 905 in the year. It then diminished considerably, but rose after the failures in 1825, and in 1826, 1827, and 1828 amounted to 3520, or 1173 in the year. There was another increase of the disease in 1832; and after the great failures in 1835, it spread so extensively that the numbers taken into hospitals in 1836, 1837, and 1838 amounted to 9740, or 3270 in the year, and of these 5387 were in the year 1837 alone." Of these latter 906, as I have already mentioned, were treated in an auxiliary fever hospital.

A reference to the above table will show that, with the exception of the year 1845, the numbers treated in the hospital have by no means diminished since former years; thus it is found that, during the years 1838, 1839, and 1840, which must be regarded as part of an interval immediately succeeding an epidemic, 6961 individuals were inmates of the hospital, or 2320 in each year; and during 1841, 1842, and 1843, 7325 were treated, or 2441 annually; and this, notwithstanding it is generally admitted that the hospital accommodation for patients affected with fever is insufficient for their reception, during its epidemic prevalence, and consequently the treatment of a very large number of them at their own abodes devolves on the district surgeons.

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* On the Management of the Poor in Scotland, by William P. Alison, M. D., F. R. S. E. Edinburgh, 1840, pp. 23 and 24.

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## ART. VI.—*Historical and Critical Remarks on the Operations for the Cure of Cataract.* PART III. By ALEXANDER WATSON, M. D., F. R. C. S. E., &c. &c.

### ON THE PROPER TIME FOR OPERATING, THE CHOICE OF OPERATION, &c.

### § 1. *General Remarks.*

I trust that the importance and interesting nature of the subject will plead my apology for adding another part to my remarks on the operations for the cure of cataract. The importance of the subject consists in the very peculiar nature of this disease,—being one which affects the eye without pain or disorder of the general health, but nevertheless, by producing blindness, unfits the individual for useful occupation;—being a disease which does not tend to shorten life, thereby increasing the anxiety for relief, and being quite incurable by art, without an operation: and hence claiming from modern surgery that the operations for its cure be brought to the greatest possible perfection.

The remarks contained in the preceding parts related to some important particulars, in regard to these operations, which have been suggested to me by experience, and appeared to be deserving of special notice. In the present I shall remark on the several queries relating to collateral circumstances which have been subjects of discussion, and attention to which is of much practical importance in the successful treatment of this disease.

### § 2. *When is an Operation proper in cases of Cataract?*

When the patient is blind either from a complete cataract in both eyes, or in one eye while the sight of the other is wanting, there can be no doubt as to the propriety and expediency of operating. But there are cases of cataract in which only one eye is affected, and even in it the disease may be only partial, while perfect vision remains with the other, so that it is a question whether or not an operation should be performed.

In the cases of elderly persons, whose occupations do not require much exertion of their sight, and are therefore contented with that of one eye, an operation is scarcely necessary when only one eye is affected with cataract.

In young persons, however, it is of much importance to possess the vision of both eyes; on account of the greater exertion of them required, and the liability to be deprived of the sight of the other eye by injury or disease, when one is affected with cataract. It is therefore proper in such cases to restore the sight where one eye has become blind from cataract, just as we would operate on the left eye of an individual, after having restored the sight of the right. By operating on these cases without delay, the sensibility of the eye has not become impaired by disease; and I have generally found operations on young subjects more successful than those performed on patients more advanced in life. Besides, the deformity which the blind condition of one eye occasions is obviated, which, especially in females, is of very great consequence. But the risk of a collapsed eye by an unsuccessful extraction should be avoided.

There is an antiquated, though still popular, notion that a certain degree of maturity or ripeness of the cataract is necessary, before an operation can be performed. This notion, though wrong in theory, arrives at a correct conclusion; for, though not impracticable, it is improper to operate till the cataract is so far advanced as to deprive the individual of useful vision. Hence, partial or imperfect cataracts, by which the sight is not much impeded, do not require operation; and the phrase, "unripe for an operation," is better understood by the common people than any more lengthened and scientific explanation; and it is, in one sense, a correct enough expression.

### § 3. *Should both Eyes, if affected with Cataract, be operated on at the same time?*

If the patient is in a favourable state of health for it, and if the operations are to be performed with the needle, both eyes may be operated on at the same time with propriety and success. By adopting this course, the patient is subjected to only one period of anxiety and of confinement, which are circumstances of importance to all, but more especially to those who are delicate or much advanced in life.

If, however, the patient does not seem from his constitution to be in a very favourable state for an operation,—if the weakening effects of after treatment upon a feeble frame be dreaded,—or if the operation to be performed is that of extraction, only one eye should be operated on at first, and the other some time afterwards. This mode of procedure subjects the patient to less risk, and we obtain the benefit of the experience afforded by the progress of his case, to guide us in the treatment of the second operation. Moreover, the treatment to which the patient is subjected after the first operation, generally forms a very excellent preparation for the second; as we almost invariably see much less inflammation follow a second operation, either on the same eye or on the other, than occurred after the first.

### § 4. *Should the Age of the Patient influence the Surgeon in operations for Cataract?*

As this disease affects patients of all ages,—infancy, youth, manhood, and old age, I shall remark shortly on each of these.

In cases of congenital cataract, the importance of early operation is now completely established. It should be done after the infant is three months old, and before the period of dentition. But, if delayed till dentition has commenced, an interval should be selected for the purpose, after the appearance of some of the teeth.

In infancy and youth, operations for cataract generally produce less inflammation and are more successful than in more advanced life. They should, therefore, never be delayed on account of the youth of the patient.

In manhood and more advanced life, inflammation is more apt to follow operations for cataract, than either in infancy, youth, or old age; and hence, greater precaution is necessary in the preparation of the patient, and more activity in the after treatment.

What is the greatest age at which an operation for cataract may be successfully performed?

Banister mentions his having couched successfully the cataract of a lady aged 83 years, after having been blind of that eye 43 years; in another person of 98 years, the eye having been 18 years blind.

Pellier in 1779 operated on a gentleman aged 84 years, who recovered his sight in 20 days. The operation was accomplished in 17 seconds!

Mr Lawrence states that he operated by extraction on a late member of the profession aged 92, with the most perfect success.*

I lately operated successfully on a lady aged 86. She was not confined to bed after the operation, and no inflammation was produced by it.

This question must be decided not altogether by the amount of years which the patient may have seen, but also partly by the vigour and health he may enjoy; for these do not always depend on age. Although very advanced age does not forbid an operation, it should be a reason for selecting that which is most simple, and least likely to affect the general health by confinement and after treatment.

### § 5. *Which operation is to be preferred in cases of Cataract?*

Our more complete knowledge of this subject has now established the principle, that no surgeon can treat this disease properly who confines himself to the performance of one operation; but as the differences in the nature of the disease and circumstances of the patient require different modes of operating, so the surgeon must select that operation which is best suited to the individual case under his care. The data upon which a choice is to be made consist of these,—the nature of the cataract, and the condition of the patient. The following remarks will, therefore, be arranged so as to comprehend these:—

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* Lawrence on the Eye, second edition, p. 635.

1. *Fluid and soft cataracts* form the cases of most easy and successful operation by solution performed with the needle. They occur generally in young subjects; and they neither require, nor properly admit of, any other mode of operating.

2. *Firm and solid cataracts* generally occur in persons of middle or more advanced age; and they form the only class of cases in which any question occurs as to the proper and best mode of operation. They admit of being removed either by extraction from, or by displacement within, the eye; so this brings us to the question as to the merits of, and objections to, these operations.

Upon this question it is to be remarked, in the first place, and kept in view, that although in all the cases of this class the operation of displacement might be successfully performed, in many of them that of extraction is inadmissible. The number of cases, therefore, in which extraction might be performed is brought within narrow limits. They consist of patients affected with solid cataracts, uncomplicated with any other disease of the eye,—the patient having at the same time a good constitution, a calm mind, not irritable and restless, and his eye well formed, of proper size, and neither too prominent nor too much sunk in the orbit. To these must be added, that the patient should be favourably situated for quietness, care, and attentive nursing.

Another circumstance to be considered and kept in view in deciding upon which operation is best, regards the operator. In a case equally suitable for either extraction or depression, a decision as to the one most desirable will depend very much on who is to be the operator. Does he devote particular attention to these operations, and does he perform them equally well and successfully? If he does, certainly extraction is the most perfect operation; but if not, the depression is the safest.

A great proportion of the cases of solid and hard cataract, now under consideration, admit only of operation by displacement.

Although all cases of solid hard cataract may be cured by displacement with the needle, a great many of these cases admit of this mode of operating solely. Hence an operator might dispense with the operation of extraction, but not with that of displacement. The cases in which the cataract must of necessity be removedwith the needle, are those in which the patient has an unsound or delicate constitution, has an unusually inflammatory diathesis, or is very far advanced in life,—having the eye small, unusually prominent or sunk in the head, or the cataract complicated with other disease of the eye, as partial opacity of the cornea, adhesions of the iris, contraction of the pupil, or disorganized state of the vitreous humour.

In discussing this question, the partisans of these two operations have generally stated the advantages of the one against the disadvantages of the other. But this mode of arriving at a conclusion seems to be quite unfair and erroneous. In the preceding parts I have endeavoured to state particularly both the merits and demerits of each,—from which the reader will be able to form a more correct judgment as to the advantages and objections which may attach to each of them when applied to particular cases.

3. *Capsular cataracts*, whether primary or secondary, admit only of removal with the needle.

## § 6. *Is the season of the year of importance in Operations for Cataract?*

In Europe it has been generally remarked by practical writers on this subject, (especially those of old date,) that spring and autumn are preferable seasons of the year for the performance of operations for cataract. Admitting that this has been founded on observation and experience, the causes which have given occasion to this preference may be more powerful in one country than in another, from the nature of the climate. Unhealthy states of the atmosphere at certain seasons of the year may, in particular places, have been removed or ameliorated by the improved cultivation of the land. Besides, the modes of operating and after treatment having become so much better understood than they were formerly, that there may not now be so much necessity for attention to the circumstance now under consideration. So far as my experience testifies, I cannot say that I have seen cause for attaching much importance to this circumstance; for I have in this country seen and performed many operations for cataract at all seasons, both successfully and unsuccessfully, and I do not recollect to have attributed any of these events to the season of the year. At the same time I have no doubt that in other countries, where the colds of winter are more intense, and the heat of summer is greater than in this, or where the inhabitants at these seasons are subject to endemic diseases, the recovery from such operations may be so much influenced, that it is safe and proper to avoid their performance at those times.

## § 7. *What previous preparation and after treatment are necessary in cases of operation for Cataract?*

These are not of less importance than the proper performance of the operation. Indeed, without great attention both to the previous preparation of the patient and his after treatment, the most perfect operations for cataract may prove unsuccessful. Much more of the success of these operations depends on them than is commonly imagined. They consist in attention to many minute particulars which individually do not seem to be of much consequence; and hence their importance is often underrated. But when taken together they constitute a form of treatment which has a powerful effect upon the system, and is in most cases indispensable to a favourable result.

1. In order to prepare a patient for undergoing an operation for cataract with success, the functions of the body, including the circulation, digestion, and nervous system, should be tranquillised as much as possible by moderate diet, rest of body and mind, and such medicines as may be required to restore and promote healthy functions. After such a preparation as this, I have performed each of the different operations successfully without their being followed by the slightest pain or inflammation of the eye. But without some preparation of this kind I have seldom seen the recovery from operations prove satisfactory.

2. Neither can too much attention be paid to the after treatment. By any of the operations for cataract the eye is more or less injured, inflammation follows, and if severe or not speedily checked, this soon proves destructive to so delicate an organ as the eye.

It is to be kept in mind that, in such cases, prevention is always better than attempting to cure inflammation after it has taken place. Hence the importance of previous preparation, and such after treatment as may prevent the occurrence of inflammation. It is generally too late to apply remedies, after inflammation has come on, to preserve the eye and restore the sight. After operations with the needle it is seldom that blood-letting is necessary to prevent inflammation. But after extraction, by which more injury is inflicted on the eye, this is in general a proper precaution. In elderly persons an opiate is advisable, as vomiting and other symptoms of collapse are apt to follow, which this may obviate. Rest in a perfectly darkened room, and the constant application of cloths dipped in iced water, low diet, perfect quietness, and attention to the state of the bowels, form the proper and necessary after treatment.

This treatment requires to be continued for two or three days after operations with the needle, and for eight or ten days after extraction.

If inflammation of the eye supervenes, general and local blood-letting, nauseating doses of tartrate of antimony or ipecacuan, with purgative and sudorific medicines, should be administered with vigour, attention, and care.

## § 8. *Conclusion.*

It will be seen from these remarks on the operations for the cure of cataract, which I have now brought to a close, that two things are requisite for the successful practice of them. The one consisting of the proper qualification of the operator, the other, the proper condition and circumstances of the patient. The surgeon requires to devote more than the ordinary casual attention to the subject; the patient requires to be in very favourable circumstances, as to health and care, for having so nice an operation properly and successfully accomplished.

To secure these two indispensable conditions are of great importance to the public. Are they always properly attained? Are our students of medicine sufficiently instructed on this subject? Can the lower orders of society obtain the necessary skill and care for the relief of their affliction, which are commanded by the rich? In answer to these questions I shall not inflict on myself the odious task of detailing the deficiencies and faults of particular institutions and bodies with which I may be acquainted. But I may point out shortly what appears to me necessary for the service and advantage of the public, in reference to this subject.

The Empress Maria Theresa of Austria, in 1770, feeling much concerned about those of her subjects who were blind, caused two large wards to be prepared in the General Hospital of Vienna, for the reception of cases of ophthalmic diseases. In connection with this, the Empress also created a lectureship, to which she appointed the celebrated BARTH as teacher of the diseases of the eye, with a suitable endowment, in 1773.*

At this time ophthalmology was very little understood, either in Germany or in France; for, though there were several oculists in the latter country, they confined their attention chiefly to the operative department. Barth was therefore the first who directed his attention, in a particular and systematic manner, to the study of all the affections of the eyes and to the best modes of treating them.

Barth continued to discharge these duties till 1791 when he retired, and made way for the appointment of the illustrious Beer, who, in his turn, has been succeeded by the present celebrated Baron von Rosas.

Thus the benevolent scheme of the Empress of Austria laid the foundation for the establishment of the greatest and most celebrated ophthalmic school in Europe;—a school from which has emanated the first improvements and most valuable information upon these diseases, and which continues to be resorted to by students from all the other European states.

Could this example not be imitated, at least to such an extent as would both form a valuable addition to the medical schools of this country, and prove a blessing to the lower orders? To the consideration of those having the direction of hospitals I would recommend this query.

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* Medicinische Jahrbücher. Wien, 1819.

It could easily be shown that the *ordinary* wards of an hospital are unsuitable for this purpose. The ophthalmic patients cannot bear the light, while the others will not be without it. Besides a number of other minute and important requisites might be enumerated, which are quite indispensable for the comfort and successful treatment of such cases as would there be admitted.

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## Art. VII.—*An Experimental Inquiry into the Functions of the Ophthalmic Ganglion.* By C. Radclyffe Hall, M.D., M.R.C.S. Eng. &c. Part First.

Incomplete as our knowledge of the physiology of every part of the nervous system undoubtedly is, it will be readily admitted that modern investigations have done less to elucidate the functions of the ganglia than of the other nervous centres. The actions of the ganglionic system are indeed at present assumed rather than proved; inferences from what is probable rather than deductions from established facts. There is great difficulty in submitting any ganglion to satisfactory experimental procedure, and when this has been effected, the extensive connections of the ganglion with other nervous centres render the results obtained complex and difficult of analysis. The lenticular ganglion represents the ganglionic system in miniature. What can be proved with respect to it, may justly be taken as a safe index to the rest. From being comparatively accessible, and from its connections being limited and well-defined, this ganglion is the most eligible for the purposes of experiment. And from the effects produced on the eye being in great measure open to inspection, the results obtained are as little conjectural as the nature of such inquiries will admit of.

The results of previous experiments on the nerves of the orbit are sufficiently contradictory. Mr Mayo's experiments on pigeons appear to prove that the third nerve is the only motor nerve of the iris; his experiments on rabbits throw a doubt on that conclusion. Magendie found that division of the fifth nerve caused dilatation of the pupil in dogs and cats; contraction of the pupil in rabbits and Guinea pigs. Now, although objections have reasonably been raised against the accuracy of Magendie's mode of conducting his experiments, and especially on account of his omitting to describe the state of parts injured as it appeared after death, still such objections apply equally to both kinds of animals, and may therefore be left out of calculation for the present. The fifth nerve has been supposed to be the motor nerve for dilating the pupil; if so, whence the dilatation on destroying it in dogs and cats? If the nerve for causing contraction, either directly as a motor, or indirectly as an excitor to the third nerve, whence the contraction on its division in rabbits and Guinea pigs? Had contraction of the pupil invariably followed division of the fifth, we might reasonably have assumed that the fifth must be either an excitor or a motor nerve to the iris. On the other hand, had dilatation ensued in every animal, we might have doubted whether this was not owing to the great shock having produced blindness for the time, or otherwise, whether the fifth was not the nerve which governed the dilating movement. But such diametrically opposite results as we actually find can only proceed from some inherent differences in the conditions under which the experiment is performed, or in the relative connections of the parts injured. It has been stated that contraction is the natural state of the pupil in the rodentia, after death; and dilatation in cats and dogs. If true, this would not solve the difficulty; but I believe it to be erroneous. The pupil after death in every animal is of the medium size natural during life. The exceptions are numerous, and depend upon the state of the iris at the time of death, and upon the action of external agents after death. If the pupil is very large when death occurs, as in slow death from hanging, or prussic acid, it will retain this size for some time after death; as the body cools, the pupil lessens, but is seldom reduced to the medium size. But when death from prussic acid is instantaneous, the largely dilated pupils will contract in a few minutes after death to less than the medium size, and afterwards enlarge again. The varying degree of contraction of the *sphincter iridis* at the time of coagulation of the blood, (which *does* take place, at least in small vessels, after poisoning by prussic acid,) may perhaps account for this. If death occurs with the pupils contracted, these enlarge after a time, but do not generally attain the ordinary medium size. In practising operations on the eye of the human subject after death before the animal heat has vanished, a dilated pupil always contracts as the aqueous humour escapes. This, like the motion of a narcotized iris in extracting the lens for cataract, and like the contraction of the previously dilated pupil of a drowned kitten on exposing the animal to the heat of a furnace, in an experiment performed by Haller, is probably due to physical influence.

It has been stated that in the rodentia there is no ophthalmic ganglion, and hence inferred that the connection of the fifth nerve with that ganglion in the dog and cat, and the absence of any such connection in the rabbit and guinea-pig, might account for the different results of dividing it in these animals. The lenticular ganglion, however, does exist in the rodentia, although it is exceedingly small. Nor is there any adequate difference in its connections with the third and fifth nerves and the iris. I dissected many rabbits, squirrels, and guinea-pigs, without being able to satisfactorily distinguish a lenticular ganglion; until finding that nervous filaments always became lost underneath the optic nerve, and could not be pursued through the firm fat and small vessels on raising that nerve, I commenced differently by removing the floor of the orbit and dissecting down to the under aspect of the optic nerve. In this way may be found, beneath and closely connected to the optic nerve by its loose cellular sheath, a small enlargement on the junction of two nervous-filaments from the third nerve. Proceeding from the front of this enlargement, a few filaments course along the under surface of the optic nerve on each side, as far as the eye-ball, which they enter. No filaments pass directly from the fifth nerve to this ganglion; but the fifth and third communicate freely with each other in the *foramen lacerum orbitale*, as they do also in the dog and cat. The nasal sends some ciliary nerves, which join the rest, but are not connected with the lenticular ganglion. In the rabbit there are also two distinct non-ganglionic ciliary filaments from the sixth nerve. Most of these ciliary nerves leave the optic nerve at its point of insertion, and passing with vessels in a groove in the sclerotica, pierce the eye-ball about a line and a half external to the insertion of the optic nerve. I have not succeeded in tracing any ciliary filaments from the sixth nerve in either guinea-pig or squirrel; but as they exist in rabbits, it is probable that they are to be found in other rodents.

In the dog and cat the lenticular ganglion is large, and is formed upon the inferior division of the third nerve exclusively. It receives no distinct root from the fifth nerve, but the fifth and third nerves communicate together by nervous filaments just before they enter the orbit; hence filaments from the fifth are probably bound up in the neurilemma of the third nerve. A naso-ciliary nerve applies itself to a fasciculus of the ciliary nerves, a line or two in front of the ganglion. That the motor nerve of the inferior oblique muscle has, in some animals, a functional connection with the ganglion, and does not merely pass by and in apposition to it, may be inferred from the constancy with which the ganglion is found in close relation to that nerve. In one kitten, the lenticular ganglion was a line distant from the main division of the nerve, instead of being, as usual in cats, a bulging on the nerve-trunk. In this instance, the nerve to the inferior oblique muscle was given off by the ganglion, and not by the nerve-trunk. In some animals there is not this close relationship. In the pig, for example, the lenticular ganglion is extremely small, ovoid, and lies on the outer aspect of the optic nerve, eight or nine lines from the eye-ball. Its only connection with the branch of the third nerve, which supplies the *obliquus inferior*, is by a nervous thread an inch and a-half in length.

In the sheep and ox the ganglion is moderate in size, and formed principally by the third, and slightly by the fifth nerve. The sixth nerve does not appear to furnish any ciliary branches.

Of birds, I have examined the fowl, goose, duck, hawk, owl, and parrot. The ophthalmic ganglion is most developed in the three last. In each of these the ganglion is placed on the third nerve; in each, the ciliary nerves from the fifth do not go to the ganglion itself, but join the fasciculus of ganglionic ciliary nerves just after these have left the ganglion. In all, the third and fifth nerves communicate within the cranium. Wagner remarks that no connection has ever been made out between the sympathetic nerve and the lenticular ganglion in birds, and he considers the fact important in explaining the voluntary power which he considers this class to possess over the action of the iris. If a connection with the sympathetic be sufficient to impede voluntary power, why should not the passage of the ciliary motor nerves through the lenticular ganglion, so distinct in birds, render them involuntary? I believe that birds have not any directly voluntary power over the iris, but merely, with cats, a great facility in accommodating the eye to different distances, the action of the iris being concomitant with, and probably an essential part of, such focal adjustment.

Of fishes, in the cod, there is a large mass of grey nervous matter belonging to the sympathetic, beneath the Gasserian ganglion. From this proceeds a filament which joins the third nerve just at the point of its division. Whilst invested with the surrounding loose jelly-like cellular tissue, this has somewhat of the appearance of a ganglion; but on dissection no ganglion is found. The eye-ball receives a few filaments from the third and fifth nerve, and, in larger proportion, twigs from the sympathetic, all loosely packed together. These penetrate the cartilaginous portion of the sclerotica behind the choroid body, in which many filaments appear to terminate. In the skate, haddock, whiting, perch, trout, and eel, except in the first as regards the choroid body, I found the arrangement very similar. Neither in these nor in such reptiles as I have examined (frogs and newts) is there any lenticular ganglion.

The connection between the lenticular ganglion and the sympathetic system is well demonstrated in the sheep, in which a large grey nerve may sometimes be traced distinctly from the ophthalmic to the cavernous ganglion. In the dog and cat also, grey filaments are given slightly to the third, and in abundance to the fifth nerve, as they pass by the side of the internal carotid artery. The oft-mentioned communication between the sympathetic and the sixth nerve is not so great as it appears. A band of white fibres passes from the sixth nerve, and some grey filaments to it; but of the latter the greater number, as Panizza asserts, merely twine round the sixth, and then enter the fifth nerve.

In man, Mr Dalrymple remarks, that the long root of the lenticular ganglion separates from the nasal nerve whilst within the cavernous sinus, "ramifying on the sides of the internal carotid artery, and within the bony canal that contains this blood-vessel, it unites with other sympathetic nerves, communicating directly with the superior cervical ganglion." I have little doubt that there is a distinct continuity of grey fibre between the superior cervical ganglion and the lenticular; but I have never found the long root exactly as thus described. I have always been able to trace it, most readily in the fœtus, as a distinct thread into the Gasserian ganglion, beyond which I could not follow it. The Gasserian ganglion in man, as in the cat, dog, sheep, and ox, receives grey filaments from the sympathetic beneath it. Some of these may enter the long root of the lenticular ganglion. I never could trace any filaments from this long root through the sensory into the subjacent motory portion of the fifth. I believe that the lenticular ganglion communicates with the cavernous plexus, chiefly if not solely through the medium of grey fibres which are inclosed in the sheath of the fifth nerve, and to a less extent in that of the third. Nervous filaments from the sympathetic have been described as being traceable into the lenticular ganglion by Fontana,* Bock, Hirzel, Cloquet, Lobstein, Ribes, Chaussier, and Hyrtl. Tiedemann and Arnold state, that a nervous filament passes directly from Meckel's to the lenticular ganglion. This I have never found either in man or animals. Hyrtl, who has examined this filament microscopically, considers it merely a fibrous chord.

The ultimate distribution of the ciliary nerves is perhaps not quite settled. That by far the greatest number may be distinctly traced into the ciliary circle, and their ramifications with care followed through this into the iris, is sufficiently established. But Chaussier and Ribes describe a minute nerve as proceeding from the ganglion to the *arteria centralis* where it enters the optic nerve; and Tiedemann traced this *nervus centralis* in the ox as far as the retina, where it accompanied the different branches of the central artery. He also thought that the lens and vitreous humour received some filaments. Hyrtl states that he has seen some filaments detach themselves from the ciliary nerves after these had traversed the sclerotica, and pass backwards ramifying on the choroid, but he could not assure himself whether or not these recurrent filaments reached the retina. Ribes believes that he has traced them into the retina.

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* Diss. Inaug. de Amaurosi Functionali. Auctore Ed. Stephens, M.D. 1827, (p. 16.)

The following are the general conclusions from the anatomy of the lenticular ganglion in different animals; that its size is always in proportion to the activity of the iris, which in turn always bears a direct relation to the strength and acuteness of vision, and to the nocturnal habits of the animal, and implies a proportionate development of the internal vascular apparatus of the eye; that it is always more intimately connected with the third nerve than with any other, and always with that division of the third nerve which supplies the inferior oblique muscle; that the size of the short root is in direct ratio to that of the lenticular ganglion, (the long sensory root observing no such relation;) that it is sometimes a mere swelling on the trunk of the inferior division of the third nerve itself, and then can scarcely be said to possess any short root; that it is always connected with the sympathetic, but that the nerves along which these communicating fibres pass, vary; that it is always connected with the Gasserian ganglion, receiving filaments from the sensory, never from the motory portion of the fifth nerve; these filaments being few in number and never terminating in the lenticular ganglion, which they enter either separately and distinct from the third nerve, as in man, or bound up within the same sheath as the third nerve, as in several animals; that there always exist other ciliary nerves from the fifth, which have no connection with the lenticular ganglion, although they ordinarily apply themselves to nerves which proceed from that ganglion. But in the rabbit, perhaps in all rodentia, there exist also ciliary twigs from the sixth nerve, which do not enter the lenticular ganglion.

Without this prefatory anatomical detail, certain points in the following experiments might appear unintelligible.

*Experiment* I.—A young dog was stunned by a blow on the head, and his skull opened as quickly as possible. Fine needles were inserted carefully into different nerves, and the wires of a small galvanic battery applied to the needles when inserted.

1. One needle placed in the optic chiasma; the other through

the cornea into the iris of the left eye. Both irides acted, contracting the pupils; both eyeballs were rapidly moved in different directions, and various muscles in the body contracted. Hence, the stimulation of the optic nerves acted not directly on the iris, but mediately through the motor nervous tract. This is further proved by the next observation.

2. The left optic nerve was divided, and both needles inserted into its distal portion. No effect.

3. Both needles were inserted, at a small distance from each other, into the ophthalmic division of the fifth nerve on the left side, the left optic nerve being already divided. The pupils remained immoveably dilated, but the eyeballs were moved quickly in different directions.

4. The same repeated after dividing the left fifth nerve at its origin. No movement whatever. Hence, stimulation of the fifth nerve can excite indirectly the action of the orbital muscular nerves, but has no direct motor influence over the orbital muscles; secondly, it has not directly either an excitor or a motor influence over the iris.

5. The left third nerve being separated from the brain, both needles were inserted into its distal portion. A brisk somewhat quivering motion of the left eyeball resulted; the cornea was occasionally turned with a semi-rotatory motion upwards and inwards under the inner canthus, and the pupil contracted. Hence the third nerve has a direct motor influence on some of the orbital muscles, and on the *sphincter iridis.*

6. The same repeated on the cerebral portion of the third nerve after dividing its trunk. No effect. The third nerve, therefore, does not cause contraction of the pupil by exciting other nerves.

7. The needles inserted into the right optic nerve, both third nerves being now divided. No effect. Hence the optic nerve influences the iris solely through the third nerve, since the other nerves on the right side were as yet intact.

8. The needles being applied to the right fourth nerve, the cornea of the right eye was rapidly revolved downwards and outwards, to attain which it swept round the lower lid, and was not drawn in a straight line to the axis it arrived at. Pupil unaffected.

9. On galvanising the sixth nerve in a similar way, the eyeball was retracted and directed outwards. Pupil unaffected. The two last observations point out the normal action of the superior oblique, abducens, and retractor muscles.

*Experiment* II.—The spinal chord of a large cat was suddenly divided between the first vertebra and the occiput.

10. Both pupils were immediately dilated to the utmost, and light had no effect on the eye.

11. Galvanism applied, as in the preceding experiment, to the optic nerves. No effect.

12. To the fifth nerve. At first there was a slight movement of the jaw. No effect on the iris or eye-ball.

13. To the third nerve; to the iris itself; to the *recti oculi;* alike without effect.

14. To the walls of the heart. No effect.

15. To the muscles of the trunk. Contraction ensued.

16. The cornea of the right eye was punctured with a cataract needle. On the following day the pupil of the right eye was less than the medium size; that of the left (non-punctured) eye rather larger than the medium size, but considerably smaller than for some time after death. In this experiment the great and sudden injury to the medulla appears to have altered the conducting power of the nerves. The co-existence of the maximum dilatation of the pupils, with depressed or destroyed conducting power of the nerves in general, if that existed, is an argument against there being any special motor nerve for dilating the pupil.

*Experiment* III.—A young dog had a large dose of prussic acid poured through a blowpipe into his œsophagus. He turned over forcibly, protruded his tongue, and was dead.

17. Both pupils equally dilated to the utmost.

18. The skull was opened speedily; but for four or five minutes it was impossible to distinguish the nerves at the base from the welling-up of blood. As soon as practicable, both needles were inserted into the right Gasserian ganglion. Slight quivering of the upper eyelid, movement of the jaw, no movement of the iris or eyeball.

19. Needles inserted into the optic chiasma. No effect.

20. Into third nerve. No effect. The absence of movement in this experiment might arise from the second and third nerves having had their conducting power impaired either by the exposure, or by pressure in sponging up the blood, or by stretching in raising the brain so as to reach the Gasserian ganglion. For an instant the third nerve did slightly respond to excitation of the fifth, by causing raising of the eyelid, but not to the usual extent, since there was no action of the muscles of the eyeball. The motor portion of the fifth having been less exposed in the experiment acted well when the needles were passed into it.

21. The roof of the orbit was then removed, and one needle stuck through the optic nerve near to the eyeball, and the other needle through the soft parts close to the outer side of the optic nerve. The eyeball quivered, and the pupil alternately contracted and dilated. The pupil of the other eye was unaffected during the changes in this, hence the effects were doubtless owing to the second needle being in contact either with the lenticular ganglion,

or the ciliary nerves, or with some branches of the third, and so directly stimulating the motor nerves of the iris; and this is the more probable since the intercranial portion of the third nerve must by this time have lost its conducting power. The oscillatory motion of the iris is what we should expect from an intermitting stimulation of its motor nerve, such as would arise from the mere application to the exterior of the nerve of a needle connected with a feeble galvanic battery.

22. After this, I could not perceive that any motion resulted from having one needle through the optic nerve and another in the iris; nor from one in the lenticular ganglion and the other in the iris. But the parts had become cold from exposure, and galvanism to the orbital muscles had no effect. When both needles were passed through the facial nerve, the muscles of the cheek twitched, but only to a slight degree. The poison appears to have lessened the irritability of the muscular system in general, as there was by no means the same amount of muscular contraction from galvanising the different nerves as in the previous experiment, (No. I.), although the two dogs had been about equal in size, age, and vigour; and the galvanic apparatus was the same.

23. The blood coagulated on the table.

*Experiment* IV.—A kitten was held under water, and its eyes kept open. It struggled violently.

24. The pupils were more contracted than before submersion. Haller states that the pupils of a cat under water are dilated. Doubtless they are so, when congestion of the brain has produced insensibility of the retina, but until asphyxia is complete, the general spasmodic action (struggling) of the muscles appears to be participated in by the *sphincter iridis.*

25. The cranium was opened and the *dura mater* cut through. Both pupils immediately became fully dilated.

26. Pricking through the Gasserian ganglion caused motion of the jaw, but had no effect on the eye.

27. Pricking and pinching the ophthalmic branch of the fifth nerve had no effect on the iris or orbital muscles.

28. Division of the fifth nerve had no effect. As the pupils were already of their maximum size, and as division of the fifth nerve usually in cats produces that state, no effect on the pupils was to be expected. But as the *portio minor* of the fifth was able to act, as proved by the movement of the jaw, the *portio major* probably was also. Hence, the non-contraction of pupil, and non-movement of any of the orbital muscles, prove that the fifth nerve has not *in itself* any motor power for causing contraction of the pupil or of the orbital muscles. That it may not be an excitor nerve to both the iris and the muscles of the eyeball is not proved by this experiment, since we have seen (§ 17) that its sti-

mulation will sometimes excite movement of the eyelid, which did not occur here. The same want of conducting power in the excito-motory chain which prevented the one action might also have prevented others.

29. The roof of the orbit was then rapidly removed, and the ciliary ganglion and its nerves exposed. Pricking the third nerve, or the ganglion itself, or pinching the fasciculus of ciliary nerves which proceeded from it, caused the previously large and round pupil to become smaller and elliptical; but on ceasing to apply the stimulus the pupil instantly expanded again. I think that the contraction of pupil was most marked when the ciliary nerves were irritated. The experiment was repeated on the nerves of the other eye with similar results. As the fifth nerve had previously been divided within the skull (§ 28), this experiment proves that the pupil will both contract and dilate, notwithstanding the fifth nerve is cut through. The proof, however, that the fifth nerve has no control over the action of the iris is not complete, since there might have been sufficient nervous energy left in the nerve-tubes to produce the actions manifested.

30. The other eyeball was removed from the orbit. Its pupil was at first dilated, but in two hours it had become very small. On the following day, it was rather enlarged again. In the eye which was left in its orbit, the pupil gradually diminished to nearly the medium size, and in that state remained until decomposition commenced. The greater contraction of pupil in the removed eye was probably owing in part to mere shrinking of the tunics from drying; favouring the *rigor mortis* contraction of the *sphincter iridis.* This would occur sooner in the exposed and rapidly cooled eyeball, and therefore whilst the fluids of the eye were in a state better fitted to allow of great contraction of the sphincter, than in the more tardily drying unremoved eye. The inequality in size of the two pupils illustrates the fact that the iris has a tendency to retain the condition in which it is left when all vitality ceases, this tendency being due to the empty or full state of the vessels of the iris, controlled by the elasticity of its tissue, at the time of coagulation of the blood.

*Experiment* V.—A pigeon.

31. When both eyes were equally exposed to a strong light, both pupils acted consentaneously. But if the right eye was shaded, its pupil dilated singly, the left pupil remaining small.

32. When the sun's light was concentrated by a powerful lens, and thrown into the pupil, the *membrana nictitans* swept rapidly across the eye, the eyelids attempted to close, and the pupil of that eye simultaneously contracted.

33. Suddenly touching any part of the head caused similar movement of the nictitating membrane and iris. An emotional

movement from fear. This consent between the muscle which moves the third eyelid and the iris is analogous to that between the iris and *obliquus inferior* in man.

34. The brain being exposed, and its anterior portion carefully raised, pricking the fifth nerve caused violent shaking of the head, but had no effect on the eye. Hence, as Mr Mayo long since proved with respect to the pigeon, the fifth is not a direct motor nerve for contracting the pupil, neither is it a direct excitor nerve for that action, since all the other nerves being uninjured, the pupil would have lessened if it were. But as the pupils were already enlarged, though not to their maximum size, this observation does not prove that the fifth nerve has no influence over dilatation of the pupil.

35. Pricking the third nerve caused sudden protrusion of the *membrana nictitans*, and contraction of the pupil. Direct motion.

36. Pricking the optic nerve had a similar effect. Indirect excited motion.

37. On passing a needle down close to the outer side of the optic nerve within the orbit, the pupil contracted, (§ 21.)

38. On destroying the *medulla oblongata*, the pupils became suddenly still more dilated, and subsequent irritation of any nerve failed to affect the iris or *membrana nictitans*. Another instance (§ 16) in which great injury suddenly inflicted on the *medulla oblongata* appears to have destroyed the conducting power of the cerebral nerves.

*Experiment* VI.—A canary bird.

39. The Gasserian ganglion of a canary bird was exposed and cut through. The previously dilated pupils underwent no change from the division of the ganglion. The shock of suddenly opening the skull causes the pupils to dilate, probably by producing temporary blindness, like that attending vertigo. As irritation of the fifth nerve under these circumstances does not alter this dilatation, we may infer that when the retina is insensible, the fifth nerve cannot directly or indirectly produce contraction of the pupil. It is merely an assumption, however, that the retina is insensible in this case.

*Experiment* VII.—A rabbit.

40. I concentrated the rays of a candle, and threw them into the pupil. Found contraction of the pupil very slight indeed; as also in another rabbit, and in a guinea pig, where the rays of the sun were employed. In the rodentia, the iris is extremely sluggish.

41. The skull was opened. The pupils slightly contracted. (§ 39.)

42. The upper portion of the cerebral hemispheres was removed.

Both pupils became widely dilated. The concentrated rays of the sun had no effect; the retinæ were probably insensible from the shock of the injury suddenly inflicted on the brain.

42. The third nerves were exposed and irritated; the pupils contracted.

43. The Gasserian ganglion was cut through to the bone; the lower jaw was violently moved for the instant; the pupils remained immovably contracted.

44. Optic nerves irritated; no effect on the already contracted pupils.

45. *Medulla oblongata* broken up; various muscles were spasmodically contracted, but the pupils remained small and unaltered.

46. In four hours after death, the pupils had increased to almost the medium size. In this experiment division of the fifth nerve (§ 43) was not proved to have caused contraction of the pupil, because that state had already been produced by irritation of the third nerve, and had not yet subsided; and, as the third nerve had not been divided, even if dilatation had come on before the injury to the fifth, though unobserved by me, and contraction again ensued on cutting through the fifth nerve, it would have been uncertain whether the fifth acted as an excitor or as a direct motor nerve to the iris.

*Experiment* VIII.—A young rabbit. The blade of a small knife was passed into the right hemisphere of the brain in such a way as to pierce probably the *corpus striatum* and *thalamus opticus*, but not to injure the nerves.

47. Both pupils contracted to a small but not to the minimum size; they dilated again, and alternately contracted and dilated, the contraction lasting longer than the dilatation.

48. The fifth nerve on the right side was then divided. The animal struggled violently; the right eyeball was greatly protruded, and its pupil gradually contracted to the size of a pin point. Left pupil of the medium size. On opening the cranium the optic and third nerves were found uninjured on both sides.

49. Irritation and then division of both third nerves caused pin-point contraction of the left pupil, but did not affect the contracted condition of the right one. Hence the third nerve in the rabbit, as in the cat and dog, (§ 42), has an influence over the *sphincter iridis*.

50. Division of the optic nerves had no effect on either pupil. Both third nerves being previously divided, the optic nerves could cause no movement of the iris through them; but as the fifth nerve on the left side was still uninjured, if the fifth have the power of directly causing dilatation of the pupil, this should have resulted in the left eye.

51. Division of the Gasserian ganglion on the left side caused

movement of the jaw and spasmodic *co-ordinate* movements of the paws, but had no effect on the contracted pupil. This and the preceding observation (§ 50) prove that in the rabbit the fifth nerve cannot be a direct motor nerve for dilating the pupil.

52. The right fifth nerve was found to have been imperfectly divided just in front of its ganglion. Its complete division did not alter the pupil. As this incomplete section of the fifth nerve affected the pupil just as greatly as complete section usually does, and as the former must keep up a state of irritation in the injured nerve, it is probable that the effect on the iris of complete division of the fifth is due to irritation of that nerve, and not to the loss of any motor power.

53. The encephalon was turned back, but not detached. The heart beat feebly, and there were occasionally slight convulsive movements of the body. On exposing the pericardium the auricles were seen to contract twice, and sometimes thrice for one contraction of the ventricles. The slow action of the heart permitted its motions to be readily observed. Diastole appeared to be at first active and sudden, afterwards passive and regular; the belly of the ventricle slowly swelling out as its cavity became full. During systole a series of changes occurred: first, the apex of the ventricle was tucked in; secondly, the lower part of the ventricle contracted, and its upper part bulged forwards; thirdly, this distended upper part was suddenly dimpled in, and at the same moment the apex elongated and tilted forwards. The entire systole presenting a sort of spiral movement, commencing quietly at the apex, spreading towards the base of the ventricle, and terminating abruptly by the dimpling in of the wall of the ventricle, and simultaneous elongation of the apex. The same kind of spiral twist made by the ventricles in contracting, I have likewise observed in the mouse and the dog. Is the dimple in the wall of the ventricle when most distended owing to the *carneæ columnæ* contracting so as to render the ventricular surface of the valves to which they are attached an inclined plane towards the orifice of egress, at the same time that the other ventricular muscular fibres contract to expel the blood?

54. Half-an-hour had now elapsed since the brain was first exposed; the action of the ventricles had become very tardy. A probe was pushed down the vertebral canal in front of the oblong and spinal chord, and left there. For three minutes there was no effect, then increased action of the heart, very rapid but feeble. In forty minutes from the first exposure of the brain the ventricles ceased to act. On pressing them so as to expel part of their contents, they twice recommenced contracting, and beat three or four times. In 46 minutes the auricles ceased to act.

55. The eyes were noticed from time to time when the ence-

phalon was turned back. They were, of course, separated from all their cerebral nervous connections. In five minutes after this both pupils had slightly enlarged; in thirty they were enlarged to almost the medium size.

*Experiment* IX.—A young rabbit was pithed between the first vertebra and the occiput.

56. Both pupils instantly contracted to the size of a pin-point. There was only momentary struggling, and the heart instantly ceased to beat.

57. The head being opened, the optic, third, and fifth nerves were successively pricked and then divided alike, without any effect on the contracted pupils. There was a slight grinding of the jaw on dividing the fifth nerve. As we have seen that irritation of the second, third, and fifth nerves produces in the rabbit contraction of the pupils, and as that state already existed here, this observation merely proves that none of these nerves on being irritated induce dilatation.

58. On opening the chest the right ventricle of the heart was blue and greatly distended; the left ventricle contracted. Scratching the muscular texture of the heart had no effect; neither did any action follow the pushing of a probe down the spinal canal, (§§ 16, 38, 54.) The lungs were dark-crimson, did not collapse, and contained tubercles, some of which were suppurating. In the rabbit (Exp. 8), the lungs were of a pinkish-yellow colour, and collapsed immediately on exposure to the air.

59. Two minutes from the time of pithing the pupils were slightly enlarged; presently they attained almost the maximum of dilatation, which in three days afterwards was still the same.

*Experiment* X.—A full-grown rabbit was stunned by a blow on the right side of the occiput, so directed that the line of concussion was along the right side of the head.

60. Both pupils had previously been of the medium size. The right pupil instantly contracted to its minimum; the left gradually enlarged to its maximum. The right eye was protruded;—precisely what is often observed in man as the effect of injury to the head. I afterwards found that the blow had driven fractured portions of bone into the right cerebral hemisphere, where also there was of course extravasation of blood.

61. The cranium was opened and the brain carefully lifted up. The optic, third, and fifth nerves were irritated and then divided on each side, in different order of sequence, but without any effect on the pupils. The brain was then taken away. The immediate effect of the injury had been irritation of the motor nerves of the right eye; and gradual palsy of the retina, with dilated pupil in the left eye, from hæmorrhage probably. Here, as after other severe shocks, (§§ 16, 38, 58), none of the nerves would respond to mechanical irritation.

62. In three minutes the dilated left pupil began very slowly and gradually to contract. In twelve minutes the contracted right pupil began very slowly to dilate. In two hours the pupils were almost but not quite of equal size; in twenty-four, the left pupil was still rather the largest. In each orbit a considerable coagulum of effused blood surrounded the optic nerve, extending amongst the orbital muscles and spread over the back part of the sclerotica.

*Experiment* XI.—A rabbit was tied, and its eyes watched for some minutes.

63. Under the influence of fear, the heart beating rapidly, and the breathing hurried, the pupil of the eye I was watching became very small, but not of its minimum dimensions; the pupil of the other eye, in a darker situation, being large at the time. On turning this towards the light and examining it, its pupil contracted sluggishly, and that of the other eye (now in the shade) became dilated. There is not, consequently, in the rabbit the same degree of consent between the irides, which we see in man.

64. After admeasurement on a dissected rabbit, I pushed the knife blade into the left side of the head, so as to divide, as I supposed, the fifth nerve, just in front of the Gasserian ganglion. The animal shrieked and tossed its head about; and the left pupil for the first few seconds was unaltered; it then steadily and gradually contracted to the size of a pin-point, which it had attained in about a minute from the time of the puncture. There were now slight convulsions for a short time, and then the rabbit lay still and quiet. The left pupil was of its minimum size, and the surface of the eye insensible, and as a bright light did not cause winking or distress, probably the retina also was insensible. The right eye had its pupil of the medium size, active, and both conjunctiva and retina sensible.

65. In half an hour,—rabbit is still and hangs down its head, but walks when its legs are touched; heart beats feebly and rapidly; vermicular motion of the intestines can be seen through the integuments. The previously-contracted left pupil is now of almost the medium size; the right dilated. The rabbit died quietly in about two hours and a half, after having tossed its head convulsively once or twice.

66. On the following day it was carefully examined. The narrow blade had passed across the floor of the left side of the base of the skull, slightly nicking the under surface of the left cerebral hemisphere, and passing beneath the *tractus opticus* without touching it, but not quite as far as the mesial line. All the nerves which passed through the left sphenoidal fissure were divided; also the left internal carotid artery and the cavernous sinus.

The bone beneath was nicked. No other parts had been directly injured by the knife. Between the *dura mater* and the convexity of the left cerebral hemisphere was a layer of coagulated blood, forming a complete red coating. A large clot lay at the base of the brain pushing upwards both optic nerves, extending beneath their commissure, and pushing upwards also the third nerves. The entire spinal chord was coated with congealed blood, which extended as far as the *cauda equina* and filled up the interstices of the nerves there. The central vessel (vein ?) of the chord was gorged, forming a dark blue line through the entire length. The posterior fissure was filled by a layer of coagulum. This experiment was performed in imitation of Magendie's, in order to ascertain with what accuracy the results ascribed could justly be referred to section of the fifth nerve. For anything shown to the contrary, by experiments like this taken singly, we might attribute the contraction of the pupil with equal reason to section of the third, fourth, or sixth nerve, or to hæmorrhage affecting the brain and spinal chord, or to spasmodic action of the orbital muscles, as to mere division of the fifth nerve.

*Experiment* XII.—A rabbit a month old.

67. On removing the upper part of the cranium the pupils slightly contracted, the effect of the physical reaction of pain probably. In cats, dogs, and pigeons (§§ 26, 57, 100,) irritation of the fifth or any other sensational nerve fails to cause immediate contraction of the pupils ; in the rabbit it does cause this. Hence pain excites contraction of the pupils in the rabbit, but not in the other animals above-mentioned.

68. The anterior portions of the cerebral hemispheres were removed. No effect.

69. The cerebrum was turned back, putting the optic nerves on the stretch. Both pupils instantly became largely dilated ; probably from the tension of the visual nerves producing blindness.

70. The left optic nerve was divided close to the optic foramen. The pupil of the left eye instantly contracted to the medium size ; that of the right eye remained dilated. The contraction of the left pupil was probably due to the cerebral cut end of the optic nerve irritating the left third nerve in the excito-motory manner.

71. The left third nerve was half-divided ; minimum contraction of left pupil but for an instant only (*direct* irritation of the iridal motor nerve.) The nerve was next completely cut through. No effect.

72. Left fifth nerve was cut through close to the pons. No effect. Division of the fifth over the temporal bone produces pin-point contraction : division of the fifth close to its origin does not increase the amount of contraction left after division of the

third nerve, although this was not the minimum. Hence the pin-point contraction does not result from any direct motor power conveyed by the fifth.

73. Right optic and fourth nerves divided. No effect.

74. Right third nerve cut through before entering the sheath of the cavernous sinus. The right pupil instantly contracted, but not to its smallest size.

75. The right sixth nerve was divided *between its origin and the Gasserian ganglion before reaching the level of the latter.* The right pupil instantly assumed its smallest—pin-point—dimensions. Of all the nerves of the right eye the fifth and sixth alone had here been left intact. Division of the sixth nerve caused pin-point contraction of the pupil. The fifth nerve having no direct motor over the iris in the rabbit, any more than in other animals, (§ 72,) the sixth nerve must have caused this extreme contraction of the pupil by virtue of its motor power discharged under the irritation of the division of the nerve, or under irritation of the fifth as an excitor nerve. Why then did not division of the left fifth nerve equally cause minimum contraction of the left pupil (§ 72), since although the third nerve on that side had been divided the sixth had not? I can only account for this by supposing that the capability of producing motion in the excito-motory manner by irritating a sensational nerve may be lost earlier than that of inducing motion by directly stimulating a motor nerve. This view is supported by the non-effect at this period of the experiment of irritating the right optic nerve (§ 73), although the third nerve was uninjured.

76. The right fifth nerve was now irritated over the temporal bone from the point of exit backwards to the Gasserian ganglion, and then divided at different points, with the intention of touching any subjacent filaments from the sympathetic. No effect on the contracted right pupil. In two hours from the time of death, the pupils were equal, and almost but not quite of the medium size. In three days, unaltered in dimensions.

*Experiment* XIII.—The spinal chord of a young rabbit was divided close to the occiput.

77. Both pupils immediately contracted to less than the medium size.

78. In three minutes the pupils had enlarged to the medium size. In ten they were almost of the maximum size. In two hours the same; in three days after death the same. In the cat, dog, and pigeon (§ 38), on dividing the spinal chord close to the occiput, the pupils *instantly* dilate, probably from the blindness induced. In the rabbit they first contract and afterwards *gradually* dilate. Whence the difference? The rabbit must be as much blinded as the cat or dog. It is probably owing to

pain stimulating the sixth nerve in the excito-motory way, and partly also to direct stimulation of the motor power of the sixth nerve; since there is convulsive movement of the body generally in all animals on dividing the medulla; and there seems no reason why the sixth nerve should be exempt from such influence. In the cat, dog, and man, the third nerve, or at least that portion distributed to the iris, is completely controlled by the state of the visual apparatus. During violent epileptic paroxysms, we may have either dilated fixed pupils, or contracted or oscillating pupils: whereas if the third nerve were entirely regulated by the spinal centre, we could never have the pupils otherwise than contracted during general convulsions, provided the third nerves were not paralysed. It is not difficult to see a final cause for this arrangement. It would obviously be inconvenient were the pupils to be affected in size, and therefore the vision in correctness, by every acute sensation, in predacious animals whose habits expose them to painful injuries; and also in man.

*Experiment* XIV.—Exposed the *par vagum* and superior cervical ganglion, and upper cervical nerves of the left side in a rabbit.

79. Pupils of the medium size when the nerves were not irritated. Pinching the cervical nerves caused pain, general convulsive movements, and slight and gradual contraction of the pupils.

80. Pricking and pinching the first cervical ganglion of the sympathetic had no effect on the pupils, nor did it cause any general muscular movements. This ganglion was then *half* cut through, and the wound sewed up.

81. Incisions about the eyelids, and pinching the exposed infra-orbital branch of the fifth nerve caused struggling, and gradual and slight contraction of the pupils. Proving, with the preceding observations, that in the rabbit irritation of sensitive nerves sufficient to excite motion of voluntary muscles has also some effect in contracting the pupil, probably through the sixth nerve.

82. All the textures behind the right eyeball were cut through. The pupil contracted to its minimum. The eye was then removed. Removal of the eyeball in the cat causes at the time dilatation of the pupil (§ 30.); in the rabbit, contraction. In the first, blindness causes expansion in the absence of any power of the sixth nerve to contract the pupil. In the second, the injury to the sixth nerve causes contraction, notwithstanding the blindness. In both, the size of pupil undergoes alteration after the loss of all vitality. (§§ 84, 86.)]

83. On being set at liberty, the rabbit walked about but without any revolving movement. This proves that the walking in circles sometimes witnessed in experiments on the encephalon is not owing to blindness of one side, as some have supposed.

84. The pupil of the removed eye remained of its minimum size for ten minutes, and then slightly enlerged. In four hours it was of the medium size. In thirty-six the eyeball was shrivelled and flaccid; pupil unaltered.

85. The pupil of the left (unremoved) eye in four hours after exposure of the nerves was of the medium size; cornea clear. In thirty-six hours cornea still clear; pupil rather larger than the medium, but active. No puriform secretion on conjunctiva, though its inferior segment had been uncovered. The moderate dilatation of the pupil might be owing to congestion and want of power in the brain as the animal became weaker, rather than to any direct influence of the injured cervical ganglion upon the eye.

86. In thirty-seven hours the rabbit died. Pupil at first of its minimum size; by the following day it had enlarged to almost the medium size; after this it did not change.

*Experiment* XV.—A full grown guinea-pig. The knife-blade was pushed into the left side of the head.

87. General convulsions. Left pupil contracted; right of medium size.

88. The spinal chord was divided close to the occiput. Left pupil unaltered; right was contracted for an instant and then was largely dilated (§ 78).

89. In ten hours after death both pupils were nearly of equal size.

90. On examination it was found that the instrument had not entered the cranium at all, but had passed into the orbit just in front of the *foramen opticum*. *All* the nerves and vessels of the back part of the eye were torn through. This was tantamount to removal of the eyeball, and illustrates a previous observation on the rabbit (§ 82.)

*Experiment* XVI.—A young guinea-pig. The instrument was passed into the right side of the head.

91. Right pupil dilated; left slightly contracted. The animal died in a quarter of an hour.

92. On dissection, there was extravasation extending over both cerebral hemispheres. The knife had cut through the right *corpus striatum*, *thalamus*, and *tractus opticus*, but had not injured the third, fourth, fifth, or sixth nerves on that side. On the left side, it had half divided the fifth anterior to its ganglion, had not cut any other nerve, but had nicked the under surface of the left cerebral hemisphere. From the guinea-pig possessing a very conical cornea, and a very dark-coloured iris, it is difficult to see distinctly the actual size of the pupil; hence guinea-pigs are unsuited for these experiments. Enough, however, has been shown to prove that they agree with rabbits in the phenomena presented.

*Experiment* XVII.—A kitten. The instrument was passed into the cranium on the right side.

93. Both pupils instantly and equally contracted to their minimum size, but on letting the kitten raise its head, it looked about it, and both pupils enlarged simultaneously. The fifth nerve had not been divided, sensibility being perfect on both sides.

94. Divided the fifth nerve on left side. Left pupil immediately dilated to its maximum size. Right pupil of medium size, and obedient to the light.

95. Vision of right eye perfect. Left eye winks simultaneously with the right, when a threatening gesture is made so as to be seen by the right eye; but not otherwise, though the conjunctiva of the left be irritated. Hence the left *portio dura* was uninjured.

96. On being placed on the floor, the kitten walked briskly round and round, the left eye being towards the centre of the circle. It lived for two days, lying still and motionless the greater part of the time, but occasionally walking rapidly round in circles until at length it would fall down from giddiness. It was destroyed with prussic acid.

97. From the time of the injury (§ 94) the left pupil had remained largely expanded; the right had been active but usually very small: it now became equally dilated with its fellow, as the effect of the prussic acid.

98. Examined the following day. The puncture on the right side had merely penetrated the lower portion of the right cerebral hemisphere as far as the *corpora quadrigemina,* but had not injured the nerves. The puncture on the left side had divided completely the third and fourth nerves; partially cut through each of the three divisions of the fifth; not divided the sixth; cut through the left *crus cerebri*, *tractus opticus*, and the lower portion of the left cerebral hemisphere. There was red softening of the cerebral matter around, and a small clot filled up the cut. On the left side, slight extravasation of blood, but diffused inflammation of the membranes. Spinal chord normal. No extravasation in either orbit; the lids of the left eye were glued together, and there was purulent matter between them and the cornea: the cornea was clear; both pupils equal; less than immediately after death, but exceeding the medium size.

The simultaneous contraction of both pupils in the first place, (§ 93), was due to irritation of the *corpora quadrigemina*, to which the instrument had penetrated. The dilatation of the left pupil on dividing the left fifth nerve was probably due to concomitant division of the optic tract and third nerve; and proves, since the sixth nerve was intact, that in the cat there is not any such excito-motory action on the iris between the fifth and the sixth nerves as we find in the rabbit; unless, indeed, we assume that in the cat the sixth nerve dilates the pupil, which is disproved in the dog, (§ 9); and as the anatomy of the orbital nerves is very similar in the dog and cat, it is presumable that the physiology of them is so likewise. Could we manage to divide the third nerve in the cat, without at all injuring the optic visual tract in any part of its course, the primary effect on the pupil would probably be contraction, from the irritation of dividing the motor nerve of the *sphincter iridis*; dilatation occurring secondarily as soon as the irritation had subsided, or rather as soon as the nerve separated from its centre ceased to have the power of conveying irritation. But it is impossible to devise any mode of testing this, since, however carefully we attempt to expose the third nerve, the displacement of brain and consequent stretching of the optic nerves, independently of the shock, will invariably produce blindness and dilated pupils first; and when no longer controlled by the retina, the iris has always a tendency to retain for a time the state in which it is at the time blindness occurs.

*Experiment* XVIII.—Removed as much as possible of the outer part of the right orbit of a large kitten.

99. Right eye in a state of great tension from spasm of the uncut orbital muscles. Left eye also very prominent from attempts to struggle. Both pupils equally round and large. Hence although there is tension of the eye-balls in the rabbit, on dividing the fifth nerve, yet the contracted pupil which results cannot be ascribed to that tension. In all animals in which the third nerve is the sole motor nerve of the *sphincter iridis*, squeezing of the eyeball causes expansion of pupil, probably from producing temporary congestion of the retina.

100. When the animal was suffering great pain from the injury done to branches of the fifth nerve, the right pupil remained unaltered. Hence, unlike the rabbit, (§ 67), in the cat the action of the *contractor pupillæ* is not immediately excited by the fifth nerve.

101. It was impossible to see the lenticular ganglion on account of the bleeding, but the optic nerve could be seen distinctly. On pricking it with a tenaculum, there was a slight oscillatory movement of the iris of the right eye; left eye unnoticed.

102. The cornea of the right eye was then punctured with a couching needle. As the aqueous humour slowly escaped, the iris gradually and almost imperceptibly contracted, so that in two minutes the pupil was elliptical and small, but not of its smallest size.

103. The tissue of the iris was irritated with the point of the needle; no blood flowed, nor did the iris act.

104. Prussic acid was then given. The kitten struggled vio-

lently for half a minute and died. Both eyes were watched. The left pupil immediately attained its maximum size, so that nothing more than the narrowest rim of iris could be discerned. In the right (punctured) eye, the anterior chamber instantly became partly filled with blood, probably from the scratch previously made in the iris; but as far as could be ascertained, the size of the pupil remained the same. The sudden effusion of blood from the scratch in the iris, which did not bleed at the time it was inflicted, was owing to the vascular congestion of the eye during the violent struggles produced by the poison.

105. The left orbit was then opened. Mechanical irritation of the optic and third nerves caused no effect.

106. Both eyeballs were removed. The blood in the right eye had coagulated and obscured the iris. In the left eye, twenty hours after death, the pupil was elliptical and of one-third its maximum size. In forty-eight hours, when the tunics had become dry and shrivelled, the pupil was unaltered.

*Experiment* XIX.—Divided, as I supposed, the left optic nerve within the orbit in a rabbit.

107. The left eye became more prominent and the pupil contracted at first, but in a few minutes it dilated and afterwards so remained. Right eye unaltered.

108. On the day following there was a slight secretion of mucus and subsequently of purulent matter. The cornea next became opaque. In six weeks the cornea had become nearly as clear as ever; but the crystalline lens was pushed forwards partly through the pupil, and was opaque. The rabbit lived for five months, and was quite blind of the left eye.

109. On dissection the left optic nerve within the orbit was found closely surrounded by firm lymph, but had not been divided. External, inferior, and closely applied to the optic nerve was a red coagulum in a cyst of fine cellular membrane the size of a hazelnut. The globe of the eye had evidently sustained pressure from this coagulum, and was atrophied to less than half the size of the other eyeball; yet its shape was normal, though it was scarcely larger than was sufficient to inclose the lens. The changes of size in the pupil were referable at first to irritation, and subsequently to palsy either of the optic or ciliary nerves, or both. The experiment was undertaken with the view of ascertaining the influence of the ciliary nerves on the nutrition of the eye. On consideration it proves but little, since the atrophy might be due to loss of vascular power from division of the blood-vessels, to pressure from the clot of extravasated blood, or to want of functional exercise from injury done to the optic nerve. It was probably owing to all these conditions conjoined.

*Experiment* XX.—Some prussic acid was introduced into the nostril of a young rabbit.

110. The rabbit drew in one catching inspiration, and was dead.

111. Both pupils were at first extremely dilated, but gradually they contracted to less than their medium size, and finally enlarged again in a quarter of an hour to the medium size, which was not afterwards changed.

112. Three minutes after death, the integuments were stripped off the peritoneum without lacerating it. The viscera appeared quite motionless.

113. The skin was stripped off one hind leg. On irritating the substance of the muscles they duly contracted; but irritating the nerves had no effect.

114. The blood was fluid in both arteries and veins.

*Experiment* XXI.—A full-grown kitten.

115. The knife was passed into the right side of the head with the intention of dividing the fifth nerve a la Magendie. The right eye protruded and its pupil was dilated.

116. The instrument was then introduced into the left side of the head. The left pupil gradually contracted until very small, then dilated again, and then responded to light.

117. Spinal chord divided close to the occiput, gradual dilatation of both pupils until they attained the maximum size. In twenty-four hours both pupils were equal, of more than the medium size, but much smaller than immediately after death.

118. The cornea of the right eye was punctured. The following day this eyeball was more collapsed than the other, but its pupil had undergone no change.

119. On examination the third and fifth nerves were found to have been nicked, but not completely cut through, alike on both sides. Neither optic nerve had been injured, but the right *crus cerebri*, though not the *tractus opticus*, was divided. The alternate contraction and dilatation of the left pupil, (§ 116,) was due to incomplete section of the third and fifth nerves; the fixed dilatation of the right pupil (§ 115) must have been owing to the additional injury on that side, viz. division of the *crus cerebri*. Unfortunately I did not ascertain whether the right eye was blinded by the experiment, but as the optic tract was found not to have been injured, vision might be unimpaired. In that case, the divided portion of *crus cerebri* included nerve fibres which connect the optic nerve with the origin of the third nerve; fibres, the existence of which the occurrence of total blindness with active pupils had before rendered physiologically presumable.

120. The spinal chord had been almost completely divided. Some extravasation around it, and on the surface of the pons.

*Experiment* XXII.—The moment that a pig which had been stuck appeared to become insensible from loss of blood, a needle was passed through the cornea of one of its eyes.

121. Scratching the tissue of the iris itself, and subsequently scratching the retina, alike failed to affect the size of the pupil.

The following are some of the general inferences which may be deduced from these experiments:—

1. The third nerve is the only direct motor nerve for contraction of the pupil in dogs and cats.

2. The action of the third nerve, as far as concerns the iris, is mainly under the control of the visual nervous tract.

3. As both the third nerve and some portion of the visual tract must inevitably be injured in performing the experiment of dividing the fifth nerve after Magendie's plan, the experiments of that gentleman cannot be considered as evidence that the fifth nerve is either directly or indirectly the nerve which presides over dilatation of the pupil in dogs and cats; nor over contraction of the pupil in rabbits and guinea-pigs.

4. In animals in which division of the fifth nerve causes contraction of the pupil, it does so by excito-motory action through the sixth nerve, which in these animals supplies the iris in conjunction with the third. The sixth nerve, however, not entering into the formation of the ophthalmic ganglion, which in these animals is extremely small.

5. In these rodentia, pain of any kind, whether produced by irritation of the fifth, or of any other sensational nerve, will cause more or less contraction of the pupil at the instant, attributable probably to excito-motory action of the iridal fibres of the sixth nerve.

6. Irritation of the fifth nerve, or of any other sensational nerve in the cat, and dog, and pigeon, so long as it does not affect the brain to the extent of producing vertigo, *nor the visual sense in any other way*, has no immediate influence over the size of the pupil. Hence, although the fifth is an excitor nerve to the *sphincter iridis* in the rabbit, it is neither directly an excitor nor a motor nerve to it in the dog and cat.

7. As the third nerve can always, under favourable circumstances, be made to influence the movement of the iris, *immediately* on the application of irritation, and as the iridal portion of the third nerve in all animals, in which the iris is active, passes through the ophthalmic ganglion, it follows that *the ophthalmic ganglion offers no check to the transmission of motor influence along the motor nerve fibres which pass through its substance.*

8. As irritation of the fifth nerve does not in any animal affect the action of the iris *after* division of the cerebral connections of all the other ocular nerves, and as some portion of the fifth nerve always enters into the ophthalmic ganglion, it follows, *that the filaments of the fifth nerve have not the power of affecting those of the third nerve during their course together through the substance*

*of the ophthalmic ganglion;* or, in other words, *that the lenticular ganglion is not a centre of excito-motory action to the iris.*

The applicability of these inferences to human physiology must be deduced from other facts than those developed by artificial experiments. They will prove, if correct at all, to be not unimportant towards elucidating the mechanism of the actions of the ganglia in general, and also of the encephalon and spinal chord. The following conclusions, which I hope hereafter to prove, as being in part direct inferences, in part reasonable conjectures, are for the present subjoined as mere postulates. Should they ever be established, they will induce us to question whether the action of the spinal chord is literally reflex; though they will support the great point in Dr Marshall Hall's discoveries, viz. the independent and most extensive action of the spinal chord; they will tend to modify recent views on the so-styled reflex function of the brain, and on the duality of mind. In the mean time, although it would be unreasonable to expect that any importance could be attached to these observations in their present form, yet to prevent them from being classed as mere hasty fancies, I may state in self-defence that the anatomical investigations on which they are founded have been made as extensively as my opportunities permitted, and have occupied me more or less for seven years. The details I trust to be enabled to lay before the profession.

1. The connection indicated by Messrs Todd and Bowman as existing between the caudate vesicles and some of the nerve-tubes is, I believe, universal. Every nerve-tube which can be traced to its actual origin in a nervous centre at all, is seen first to lose its white coating; next, to become smaller in calibre and varicose; and finally to terminate in an irregular-shaped grey cell.

2. There are, however, innumerable spherical cells which have no such connection with the nerve-tubes.

3. The varicose condition of the finer translucent tubes in a nervous centre I believe to be normal, and not the result of *post mortem* changes, or of manipulation. These three observations apply alike to encephalon, spinal chord, spinal ganglia, and sympathetic ganglia. The constituent parts in all are essentially similar, though greatly modified as to minuteness and delicacy of texture, and arrangement of nerve-tubes.

4. There exists an anatomical arrangement in the nerves which enables them to contain the greatest extent of tubular surface in the smallest compass.

5. When different sensations occasion similar outward manifestations, the muscular movements are affected through the same nerve-tubes; there being one tract of nerve-fibres common to several cerebral organs of sensation, which connects these with the motor tract, and not a distinct connecting tract from each cerebral organ of sensation.

6. In like manner, there is a common centre of union in which the peripheral fibres of the brain meet, where it may be presumed that different intellectual actions influence the same set of motor nerve-tubes.

7. These common centres are double, one proper to each cerebral hemisphere, yet so intimately connected together, that the two can act in unison as a single organ, or alternately as distinct organs; *e. g.* in jumping, the centres of volition act together on the motor tract, but in walking and running the right arm advances with the left leg, and *vice versa*; i. e. in ordinary progression, the anterior extremity is associated in the movements of flexion and extension with the opposite posterior extremity. This association results from alternate action of the two volitional centres.

8. All such centres of union consist of grey cells into which certain nerve-tubes open, and from which certain others (physiologically) proceed; this being one purpose subserved by every grey mass, insuring the greatest amount as well as the greatest harmony of action, at the smallest expense of nervous tissue, and of occupied space.

9. The different nervous centres can act to a certain extent vicariously; the action of one exciting, modifying, or preventing that of another, according to circumstances.

10. Through commissural (inter-central) nerve-tubes, the *vis nervosa* can travel in any direction. But through distributed nerve-tubes, whether organic, spinal, sensational, or volitional, the vis is transmitted centrifugally only, from its source (the grey cells), to its destination (the peripheral filaments.)

11. All nerve-tubes proceeding from the encephalon in part cross over to the opposite side; in part pass without crossing to their destination. I am not at present satisfied whether or not the olfactory nerve is an exception to this; but the optic chiasma, and the decussation of the anterior pillars of the *medulla oblongata* are merely the more obvious types of a similar disposition of the roots of other nerves, and of the nerve-tracts of general sensation.

12. Hence every (?) encephalic nerve has both direct and crossed roots. One purpose thus fulfilled, being the separate and distinct field appropriated to psychical (crossed tubes,) and physical (direct tubes,) centric action.

13. The cerebellum is not the co-ordinator of muscular movements, but the medium through which the cerebrum checks, controls, and suspends the action of the physical nervous centres. It is probably also a store-house of *vis nervosa,* under the control of the cerebrum, for all other nervous centres directly communicating with it.

14. When the operation of one nervous centre is frequently

connected with that of another, but not essential to it, *e. g.* sensation and respiration; the first is situated superiorly to the last, through the grey matter of which it sends nerve-tubes. In its normal moderate action, a nervous centre anatomically placed inferiorly does not necessarily call forth the action of one placed superiorly; *e. g.* the spinal chord when acting does not necessarily excite the physical centre of sensation, nor this last the psychical or the volitional centre.

15. But conversely, excitement of a nervous centre placed superiorly, if it affects the cell-origins of those nerve-tubes which pass through a lower centre, does, of necessity, call forth the conjoint action of this last, *e. g.* the volitional motor nerve-tubes pass for a certain distance before their exit from the spinal chord, through the sphere of the spinal grey matter, in this way associating with their own action, in all cases, that of spinal nerves.

16. There exist volitional and sensational (encephalic) fibres in the spinal chord, which are not merely commissural between the chord and the encephalon, but pass on, without interruption of continuity or apparent variation of texture, into distributed cerebro-spinal nerves.

17. The volitional nerve-fibres pass into the grey matter of the spinal chord, and then leave it again. The sensational fibres do not.

18. The cerebello-spinal fibres, (*i. e.* the posterior pillars and posterior strands of the lateral pillars of the spinal chord,) are merely commissural; not between different segments of the chord, but between cerebellum, centres of *medulla oblongata*, and the chord.

19. The major portion of the roots of a cerebro-spinal nerve, whether anterior or posterior, is made up of tubes which terminate in the spinal grey matter, as many passing downwards (sacrad) as upwards (craniad.) Stilling's views of posterior roots traversing the grey matter and emerging as anterior roots, I could never make out in my examinations with high microscopic powers.

20. The spinal ganglia transmit through their grey matter sensational and excitor nerve-tubes only. Sympathetic ganglia transmit encephalic sensational, but not volitional nerve-tubes, and spinal nerve-tubes, both excitory and motory. Both kinds of ganglia equally supply the capillaries with nervous power.

21. The purely ganglionic fibres can act alone without necessarily implicating the spinal fibres; as the purely spinal fibres can act without implicating the encephalon. But the purely spinal, as well as the purely cerebral fibres, which pass through the ganglia, when themselves in action always call into operation the grey cells of these ganglia. Hence either the brain or the spinal chord can excite ganglionic action.

22. As purely spinal action is not necessarily attended with any cerebral action (sensation, intellect, or will); so also, purely ganglionic action is not necessarily attended with any spinal action (involuntary muscular motion,) nor with any cerebral action.

23. The ganglia are centres of nervous action for the capillaries, and for influencing and modifying the activity of the cell-metamorphosis which constitutes nutrition. They are never centres of sensation nor of muscular motion. Whether the muscular coat of arteries is under the influence of the purely ganglionic fibres is doubtful. There are reasons for considering that it is influenced only by spinal nerve-tubes which have passed through ganglia.

24. The spinal chord is the centre of all non-psychical muscular acts, with the exception of those which result from the merely physical operation of the sensational centres. It is never the centre of sensation, nor of changes in the action of the capillary blood-vessels. Hence, the operation of the physically acting part of the nervous system may be reduced to the principle of association. The spinal chord associates the muscles with the tegumentary surfaces—internal and external, and with all other parts in which spinal nerves terminate. The ganglia associate the capillary vessels and the processes to which these minister, with all parts supplied by the spinal and sensational nerves which pass through the ganglia, more especially with the surfaces with which the given organ is most closely functionally related.

25. Every sensation is in one sense double. It is obscure, diffused, and general, in so far as it depends on the common physical centre, (through the medium of the straight fibres,) and distinct, accurate, and special, in so far as it depends on the psychical centre, (through the crossed fibres.) By virtue of the former mode of action, all sensations have points of resemblance; by virtue of the latter, all have distinct and characteristic points of difference.

26. Except through nerve tubes continuous from one of these encephalic origins to the sentient surface, how many other centres soever these sensational fibres may pass through in their course, there can be no external sensation. If so, the sympathetic ganglia, apart from the cerebral fibres which they transmit uninterrupted in their continuity, cannot act vicariously as media of sensation under any circumstances.

27. In performing experiments on living animals, we have no means of artificially exciting to action the grey cells of any nervous centre. We can do no more than stimulate the white nerve tubes to discharge their already contained force. The appearance to the contrary has been due to excitement of the white fibres transmitted by the grey centres experimented on. We may, of course, excite inflammation of grey nervous matter, and thus in-

directly and at a distant period induce phenomena attributable to the abnormal action of the nervous centre.

(*To be continued.*)

*Holmes Chapel, Cheshire,*
*January* 31, 1846.

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## Art. VIII.—*Abstract of the Modern Works on Menstruation and Fecundation.* By Dr Louis Mandl. (Archives Generales de Medecine, May 1845.)

Menstruation and fecundation have of late years been the subject of very important researches which disencumber the history of these two functions from a number of vague hypotheses. They give besides a new explanation, which appears to have a value so much the greater that it places under the dependence of a general law a fact which was usually regarded as an exception.

It is long since the existence of a spontaneous deposition of ova has been generally recognised in all classes of animals, with the exception of the mammalia and the human species. For long it has been recognised that the ovaries, as part of their natural function, formed ova in these animals, and that they were expelled without being fecundated, or requiring the participation of the male. Nevertheless human physiology had not profited by these researches, and fecundation was regarded as a particular function beyond the control of general laws. But after the discovery of ova in woman and the mammalia, it was only one step more to admit the spontaneous deposition of ova by women. Nothing was consequently more natural than the direction of the minds of the learned to this new field of research, in which MM. Negrier, Gendrin, Pouchet, Duvernoy, Raciborski, Bischoff, &c., have signalized themselves.

We shall soon have to expose the order of publication of each of their works; but we may remark in passing, without diminishing the merit of him who first announced the new theory, that new and interesting discoveries in science are never suddenly made. The history of the sciences shows that new ideas are formed by little and little.

It is M. Pouchet, we think, who has the honour of having most distinctly announced the laws which regulate the spontaneous deposition of ova by the mammalia. In his work he compares with logical acumen, the analogies which exist between women and the mammiferous females in so far as generation is concerned, and quotes the observations and experiments which support his opinion either in this work,* or, and indeed chiefly in a manuscript memoir accompanied by an atlas, presented to the Academy of Sciences, and crowned by them on its last public meeting this year.

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* Theorie positive de la Fecundation des Mammiferes, basee sur l'observation de toute la serie animale; Par F. A. Pouchet. Paris, 1842.

To make known to our readers these new researches on menstruation and fecundation we shall give an analysis of the work of M. Pouchet, without intending thereby to prejudge the merits of the other writers on this subject. But we have preferred this work, because it exposes in the most complete manner the new theory, and because it serves as a text for the observations of others.

M. Pouchet promulgates his researches under the form of ten fundamental laws, and of three accessary ones; and these we shall examine in succession.

First fundamental Law.—*In the phenomena of generation the human race forms no exception, but are subject to laws analogous to those observed in the lower animals; they are even perfectly identical with those of the mammalia.*

In all the higher animals the fundamental phenomenon of generation consists in the production of a certain number of ovules in the interior of the ovary, which ovules are afterwards fecundated by the male sperm.

The ovules produced in the ovary do not produce fœtuses unless they are first brought into contact with the prolific semen of the male; if this does not occur after a certain time they become altered and decomposed. It is generally during its passage into the sexual canal that the ovule is fecundated; but very often also the impregnation by the seminal fluid takes place after it has escaped from the body of the female, as we shall show by and bye.

No doubt can exist as to the identity of the generative phenomena in the immense legion of animals purely oviparous; while, on the contrary, with the mammalia, it was undecided by what process generation was affected, and it was believed that with them it followed a special law. Modern research has, however, proved that these animals form no exception to the general law; that they also produce ova; and that their minuteness alone had caused them to escape the research of inquirers. Thus was found demonstrated the co-relation which exists between the whole animal creation, a co-relation to which the human species forms no exception.

This fact admitted, there exists a great presumption that the fecundation and development of the ovum in woman take place according to the same laws which regulate those of the mammalia; for why (exclaims M. Pouchet) should generation in the human species be produced with a modification different from that which affects the higher mammalia.

Second fundamental Law.—*Generation among all animals takes* *place through the instrumentality of ova; some of the lower orders alone forming exceptions.*

It is actually demonstrated that in almost all animals generation takes place by means of ova; and it was with good reason that Harvey advanced the celebrated aphorism, "omne vivum ex ovo,"—a fact afterwards proved by De Graaf.

For a long time it was believed that the mammalia were not reproduced by means of ova, and this idea was the cause of the true laws of the generation of these animals being misunderstood. Now it is no longer possible to admit this exception. The honour of demonstrating this fact is due to Baër.* This discovery was afterwards authenticated by Coste,† and by the researches which Valentin undertook in concert with Bernhardt.‡

The identity of the ova, in so far as the minute structure of their fundamental parts are concerned, is no less demonstrated than their existence in the whole animal series and in woman, as we can see from the works of Purkinje§ crowned by the Institute, from those of Coste,‖ John, Wagner, &c.¶

Third fundamental Law.—*In the whole animal creation the ova exist previous to fecundation.*

By means of a scrupulous and attentive inspection, it is positively ascertained, that in the whole animal creation, from zoophytes to man, the ova exist previous to fecundation, and that they become developed in succession and at different epochs. In fact, when we examine the female organs of all the invertebrated animals, we clearly discover ova previous to fecundation. With regard to insects this is easily proved, and has been long known. In so far as the vertebrata are concerned, we know that most fishes and reptiles even deposit their ova before they have been fecundated; and that it is either only at the moment when the female deposits them, or some time after that they are vivified by the male pouring over them the seminal fluid. We know also that birds during their love season bear in their ovaries a certain number of eggs before they are approached by the males.

All these facts are positively demonstrated, and no objection has ever been raised as to their correctness; nevertheless the mammalia, on account of the minuteness of their ova, which had caused them to escape observation, were considered as forming an exception to the general law.

Modern investigators, however, have recognised that the ovaries of virgin mammalia also contained ova in different degrees of development, and M. Carus has even recently demonstrated the existence of ovules in the embryo. Ollivier of Angers* may therefore reasonably assert, that since the researches of Home, Baër, and Plagge, it has been demonstrated that the ovum is found in the ovary of the mammalia before fecundation.

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* Baer, De ovi mammalium et hominis generi. Leipsic, 1827.

† Coste, Recherches sur la generation des mammiferes. Paris, 1834.

‡ Valentin, Symbolæ ad ovi mammalium historiam ante impregnationem. Breslau, 1834.

§ Memoire présenté a l'Institut en 1835.

‖ Embryogenie Comparée. Paris, 1837.

¶ Physiologie, Leipsik, 1839. Trad. par Habets. Paris, 1841.

Fourth fundamental Law.—*In the mammalia physical obstacles oppose the contact of the seminal fluid with the ovules still contained in the Graafian vesicles.*

"Whatever be the place where fecundation is effected, it is certain," says M. Pouchet, "that it is necessary that the products of the two sexes be put in immediate contact. But almost all authors admit that the contact of the seminal fluid invigorates the Graafian vesicles, then causes their development, from which result, according to them, the production and the deposition of ova." This opinion M. Pouchet combats by the following considerations.

In order to prove that the seminal fluid determines the evolution of the ova which the ovaries elaborate, it is necessary that these ova should all be found in the same condition in the ovary. It is far otherwise, however, for they are found in very different stages of organization and size.

Besides, in order that fecundation occur at the ovary, it is necessary that the seminal fluid should get access to the ova themselves; for Spallanzani, and MM. Prevost and Dumas have demonstrated that it is not an *aura seminalis* which fecundates the ova, but the most consistent part of the seminal fluid. They found that when the seminal fluid of the frog was repeatedly filtered, the filtered liquid contained no zoosperms and failed to vivify the ova; whilst the thick portion of the fluid, which remained on the surface of the filter, contained the animalcules and vivified all the ova with which it came in contact.

This proposition once established, it follows that the ova cannot be fecundated in the interior of the Graafian vesicles; for if the seminal fluid loses its properties by passing through coarse filters, much more would it lose them by traversing the tunics which envelope the ova.

To these arguments deduced from observation and reasoning may be added those of experiment. Different physiologists, among whom may be cited Spallanzani, Prevost, and Dumas, have attempted to fecundate ova still situated within the ovary, and they constantly failed; but they always succeeded in producing the evolution of those which in the same animals they met with in the uterus. But this last fact explains itself, in our opinion, by the circumstance, that the ova still situated within the ovary were not sufficiently developed to be fecundated by the seminal fluid. We do not then see any argument from this in favour of the views of M. Pouchet. On the other arguments adduced by the author we shall make a few remarks.

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* Dictionnaire de Medecine, 1st edition, vol. xv. p. 291.

That the law established by M. Pouchet have all its force it would be requisite to prove the necessity of the immediate contact of the seminal fluid with the ovule at each fecundation. But this necessity of immediate contact has not been absolutely demonstrated. It is true that the filtered seminal fluid does not fecundate; but what analogy is there between a filter and the membranes of the Graafian vesicle? The semen contains fatty matters. May not therefore the differences of temperature, density, atmospheric pressure, &c. cause very different results? The physiologist filters; nature operates by means of endosmosis and exosmosis. The production of fat in the animal body proves that substances do not make their way through the tissues as through paper filters. An atom of sperm arrived by means of endosmosis into the interior of the vesicle, may it not act in determining the development of the ovum, like leaven in fermentation,—a comparison which we have heard made by two distinguished chemists?

It is not our intention to combat M. Pouchet's opinion further; we are simply of opinion that it will still require for its support some further experiments. But at present his theory is at least probably correct, for the necessity of spermatic animalculæ for fecundation supports M. Pouchet's theory, a fact proved by Spallanzani, Prevost, and Dumas, not even yet denied, and which of itself excludes the idea of fecundation being possible by endosmosis. The periodic development of ova over the whole animal creation also speaks in its favour; a circumstance, however, which does not exclude a development hastened by the presence of seminal fluid. In fine, the spontaneous deposition of ova in the whole animal series and in woman, as we shall show in the following paragraphs, also speaks in favour of his theory.

Fifth fundamental Law.—*In the whole animal series the ovary unquestionably developes its ova independent of fecundation.*

Naturalists have satisfactorily proved that with insects, mollusca, fishes, amphibia, and birds,

1*st.* The ova precede fecundation.

2*d.* The ova increase and undergo different degrees of development independent of fecundation.

3*d.* And lastly, that the developed ova are deposited spontaneously by the females, even though fecundation has not taken place.

It only remains to prove, then, that the mammalia are subject to the same laws, and the author calls to his aid reasoning, observation, and experiment.

Let us first consider the considerations founded on reason.

Since the observations of Haller and Malpighi it can no longer be denied, says M. Pouchet, that the yolk of the egg forms an essential part of the embryo. But this portion existing already in the ovaries of virgins, we must admit that after being developed to a certain extent it is destroyed. In fact, we cannot conceive, adds the author, that these same ovules could afterwards be absorbed and destroyed by the agency of that very organ whose sole end is to secrete them, and that this absorption occurs in all cases in which no fecundation takes place. The mammalia are in the same situation as the birds, reptiles, &c., as experiment and observation have shown.

But before consulting observation and experiment let us first examine the force of M. Pouchet's arguments. The ovules, says he, cannot be absorbed and destroyed by the operations of that same organ whose sole end is to secrete them. We shall demand, then, what becomes of the sperm, a product analogous to the ovule, in those cases where it is not emitted? Is it absorbed and destroyed by the agency of the very organ whose sole function is to secrete it? I know not; but if any one endeavoured to advance this opinion, it could not be combated, so far as I am aware, by any positive facts. What becomes of the bile, if we consider it as a product of secretion, in those cases in which the biliary duct is obstructed by a calculus?

We come now to the observations.

By arranging the facts cited by M. Pouchet we may classify the observations concerning the mammalia and women under three heads, analogous to those already exposed, and which have reference to the rest of the animal creation. The object then is to prove for the mammalia, 1*st*, That the ovules exist previous to fecundation—a fact already evidenced in the preceding paragraphs. 2*d*, That they develop themselves independent of fecundation; and 3*d*, That the developed ovule separates spontaneously. Let us therefore examine these latter points.

Modern anatomists and physiologists (Prevost and Dumas, Baër, Coste,) have distinctly recognized that the ovaries of virgin mammalia contained not only ovules, but that these existed in different degrees of development. Thus we see the second point proved.

Analogy alone allows, or rather forces the conclusion, that in the mammalia, as in other vertebrata, when the development of the ovum has arrived at its maximum, they are expelled spontaneously from the ovaries. Already M. Coste says that whilst bitches are in heat we can distinguish those ovules which are destined to be cast off, they exceed the others so much in dimensions. M. Pouchet cites also several observations made on the cat, cow, and on a young girl of 20 years, in support of this opinion.

But the direct proof of the emission of the ovules may be given in two different manners. The first would be the discovery of the ovule itself in the Fallopian tubes. M. Bischoff, professor at Giessen, has made on this subject a number of observations which establish the spontaneous deposition of the ovule at fixed periods—observations which are published in a memoir presented to the Academy of Sciences in 1843.

A second series of proofs for the spontaneous deposition of ova is furnished by the existence of *corpora lutea* in the ovaries. In fact, since we have made observations on the generation of the mammalia, we have always considered the *corpora lutea* as incontestable evidence of the rupture of Graafian vesicles, and of the extrusion of the ova which had been produced by these organs. But if it is determined that we have discovered *corpora lutea* in mammalia and in virgin women, it also becomes logically incontestable that in these animals, as in the human species, the ovary casts off its ova independent of fecundation.

Very many observers have ascertained the presence of *corpora lutea* in very young females of mammalia. Valisnieri, Bertrandi, Brugnone, Santorini, Meckel, Home, Blundell, Velpeau, and others, have also discovered *corpora lutea* in virgins of the human race. M. Gendrin* endeavoured to give anatomical proofs of the spontaneous deposition of ova by women, but his proofs were not satisfactory. M. Negrier† first accurately described the true anatomical characters of the deposition of ova by women, and the successive evolutions of the Graafian vesicles from their formation till the moment when they burst to give passage to the ovum. However, as none of the observations related by M. Negrier were made on the bodies of females whose virginal state was undoubted, the commission of the Academy of Sciences did not consider the point settled.

Almost at the same time that M. Negrier published his memoir in France, Drs Jones, Paterson, Montgomery, &c., promulgated similar opinions in England. It even appears that Dr Power, in a work published in 1821, under the title of "Essay on the Economy of Women," has stated with much clearness, and supported by numerous facts, the theory that menstruation is owing to the successive rupture of the ovarian vesicles. Ollivier of Angers‡ might then state, in speaking of the formation of *corpora lutea*, "these phenomena occur whether there is fecundation or not."

M. Pouchet, for his own part, having long since noticed the presence of *corpora lutea* in virgin mammalia and women, has stated since 1835, in his course of lectures at the Museum of Natural History at Rouen, and has since published (in March 1842), in the work now under consideration, that the increase of the Graafian vesicles in the mammalia, and the deposition of ova, are not determined by the action of the seminal fluid, and, moreover, that the ova are naturally deposited at fixed epochs. M. Coste, in 1837, published similar views, but without expressing them so strongly. More recently, in the autumn of 1842, M. Duvernoy advanced similar views at the Scientific Congress of France, at its sittings at Strasbourg.* On the 2d of December 1842 M. Raciborski wrote to the Academy of Medicine a letter, in which he spoke in a clear and precise manner of the spontaneous rupture of the Graafian vesicle at the menstrual period; and since then he has published memoirs and a work in which are narrated a series of observations in support of his opinion.

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* Archives Generales de Medecine, vols. vi. and ix.

† Recherches Anatomiques et Physiologiques sur les ovaires de l'espece humaine. Paris, 1840.

‡ Dictionnaire de Medecine, 1st Edition. Paris, 1826. Vol. xv. p. 292.

It follows, then, from all these undoubted facts, that the perfectly developed ovule of mammalia and of women escapes spontaneously in consequence of the rupture of the Graafian vesicle, independently of fecundation.

Sixth law.—*In all animals the ovules are deposited at fixed periods, determined by the periodic excitation of the genital organs.*

We shall return to this subject in the eighth and ninth paragraphs. It is proper, however, to mention, that this law has been proved chiefly by the observations of M. Negrier. In fact, all his work rests on the demonstration of this important fact, that the vesicular evolution is the cause of menstruation; and he says, (p. 71,) "the ovaries of a menstruating female, of whatever age she be, never want vesicular cicatrices."

Seventh law.—*In the mammalia fecundation never takes place but when the emission of the ovules corresponds with access to the male semen.*

It is beyond dispute that the male semen can only fecundate ovules already developed; but the development of these coinciding with the rutting period, explains why it is vain to couple animals excepting at that period. Another question is, whether the presence of the male semen hastens the emission of the ovule already developed, or hastens the development of the ovule itself. The observations yet made do not seem to be complete on this point, and in the opinion of the author still want demonstration.

Eighth law.—*The catamenial flux in women corresponds with the phenomena of venereal excitement observed at fixed periods among the different classes of animals, but especially in the females of the mammalia.*

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* Comptes Rendus de l'Academie des Sciences, Vol. xvii.

An attentive comparison of all the phenomena which accompany the menstruation of women with those which attend the rutting epochs of the mammalia, demonstrates that there is a perfect identity between them. Many observers have already noticed the analogies between these phenomena. M. Pouchet, in his printed work, is forced to prove this identity by physiological inductions; but the most conclusive proofs rest on observations made on the development of the ovules and *corpora lutea*,—observations which the author has detailed in a manuscript paper and atlas, addressed to the Academy of Sciences, and which we shall notice in the next paragraph.

Ninth law.—*Fecundation has a constant relation to the secretion of the menstrual fluid. Thus in the human species it is easy to determine with exactness the inter-menstrual period, during which conception is physically impossible, and that during which it may take place.*

Many authors, even the most ancient, agreed that conception occurs with greater facility immediately after the menstrual period; but no one had reduced this fact to a positive law previous to M. Pouchet. Let us, however, leave this subject for a moment, and turn to another very important point, that of the coincidence of the spontaneous deposition of ova with the occurrence of menstruation.

It has been proved above that the ovules are spontaneously developed, and that, quitting the Graafian vesicles, they give rise to the *corpora lutea.* These *corpora lutea* themselves present different degrees of development. But if it be proved that these bodies are so much the less developed the nearer the menstrual or parturient period be, and that, on the other hand, at a more distant period, they are more developed, and at length end by becoming atrophied, it is evident that the *corpgra lutea* are in intimate relation with menstruation. If, on the other hand, each menstruation be accompanied with the production of *corpora lutea,* as these bodies are themselves the traces of the escape of ovules, we cannot doubt that one or more ovules are expelled at each menstrual period. These different facts have been established by the observations we have above cited from MM. Negrier, Raciborski, &c. and exposed more in detail by M. Pouchet, in the manuscript memoir formerly noticed.

M. Pouchet has followed from day to day and from moment to moment all the phases of development of the Graafian vesicles; he has also ascertained that in the mammalia the ova are developed in these vesicles, and that they are expelled, without the concourse of the male, at fixed epochs, which corresponds to the rutting time of animals, and the menstrual period of women.

His memoir contains, besides, detailed descriptions of the origin, formation, and development of the *corpora lutea.* Drs Paterson, Lee, Montgomery, Negrier, &c. have established that these bodies are the result of the deposit of a particular yellow matter between the two membranes of the follicle. According to M. Raciborski this aspect results solely from the folding of the internal membrane, and from the extravasation of a certain quantity of blood, which, in women, forms a pretty large clot which fills the whole of the vesicular clot. M. Pouchet, on the other hand, affirms that the *corpora lutea* are produced by the developement of the proper membrane of the Graafian vesicle. The following are some details which M. Pouchet has communicated to us.

The proper membrane of the Graafian vesicle is formed of isolated vesicles similar to those of vegetable tissue, and the transformation into *corpus luteum* is due not to an augmentation in number of these cells, but to the increasing diameter of those already existing.

These cells have only the 0·01 of a millimeter in diameter when the Graafian capsule is about to open; and when the *corpus luteum* is formed and has filled the cavity, these cells offer a diameter of from 0·04th to 0·05th part of a millimeter, or even to that of 0·06 or 0·07.

A few months later, in November 1844, M. Raciborski presented to the Academy of Sciences the following results of his new researches relative to the *corpora lutea:*—"We have no doubt," says he, "that the *corpora lutea* are the result of modifications which the internal membrane of the follicle undergoes. We are disposed to regard them, according to our new researches, (the results of which closely correspond with those of M. Wagner,) as being due in a great part to a true concentric hypertrophy of the granular layer which covers the internal tunic. As soon as the follicle is ruptured, whether the female has had connection with the male or not, the expulsion of the ovules is always followed by the formation of complete *corpora lutea.* With woman the phenomena do not occur in exactly the same manner. Whenever the expulsion of the ovule is not followed by conception, the hypertrophy of the granular layer ceases to go on, and it remains as a membrane below the clot of blood. On the other hand, whenever the expulsion of the ovule coincides with impregnation, the elements of the granular layer multiply with such rapidity that in a very short time they form a voluminous body, which entirely fills the vesicular cavity. A most remarkable circumstance is the rapidity with which the *corpora lutea* are absorbed as soon as the woman is delivered. The coloration of the membrane which constitutes the *corpus luteum* is owing to the presence of yellow oily globules which are seen among the granulations.

Tenth law.—*There undoubtedly exist no ovarian pregnancies properly so called.*

M. Velpeau has said that until modern writers with scalpel in hand actually demonstrate that the ovum is situated within the ovary and not on its surface, reason forbids us admitting the possibility of ovarian pregnancy. M. Pouchet, relying on what he had previously stated relative to the impossibility of the fecundation of the ovule so long as it remains within the Graafian vesicle, positively denies the possibility of ovarian pregnancy; nevertheless, he does not deny that in certain extraordinary cases the ovule may be fecundated within its torn vesicle, and there grow and become developed on the surface of the ovary. The so-called ovarian pregnancies would in that case be only abdominal ones. But, according to M. Pouchet, the fecundating fluid never in the normal state passes to the ovary; it only enters for a very short distance the Fallopian tubes. This opinion, however, is opposed to that of M. Bischoff,* who considers it to be demonstrated by his experiments that, with the mammalia, the semen, after a fruitful coition, penetrates through the uterus and Fallopian tubes even to the ovaries before the ova have escaped from them, and fecundates them there.

In this manner we can easily explain extra-uterine pregnancies; for if the fecundation occurs at the ovaries, or between the fringes of the tubes, certain external impressions, as for example fright, which is cited as one of the causes of extra-uterine pregnancy, may cause such a perturbed motion of the fimbriated extremities as to destroy the organic relations which exist between these last and the ovaries.

To these ten fundamental laws M. Pouchet adds yet three paragraphs, which he entitles accessory laws, the first two of which have reference to his opinion expressed in the tenth law. The third states, that in their normal state the Fallopian tubes contract from their interior towards their exterior, and thus transport the ovule. M. Bischoff as well as Dr Blundell affirm that in bitches and rabbits which have been fecundated, they have seen the uterus and tubes agitated by lively motions which would contribute to the passage of the semen. These movements in that case occur in the direction from the vagina to the ovaries. On the other hand, the movements of the spermatic animalculi themselves, says Bischoff, contribute essentially to the progressive movement of the seminal fluid.

The observations of M. Bischoff on the motion of the semen explain how sexual connection one or two days before the menstrual period may produce the fecundation of the ovules. In this case two hypotheses are admissible; either the coitus hastens by a few days the rupture of the vesicles, or the fecundating fluid preserves its prolific qualities in the Fallopian tubes or upon the ovary for a few days, until it comes in contact with the detached ovule.

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* Developpement de l'homme et des mammiferes. Paris, 1843, p. 561.

We may here add one word on superfœtation, with which M. Raciborski* alone has occupied his attention. The object of this inquiry is to ascertain if a woman who has already conceived can be fecundated a second time, in the interval between the first conception and the period for delivery. To determine this question accurately, it is important to note the time to which the second conception is referred, or rather the period of time which intervenes between the first and the second conception.

We do not call that a case of superfœtation when two fœtuses, both arrived at term, are born the same day; for in that case two perfectly developed ova have been fecundated the same day by one or more individuals. Thus the birth of twins of the same colour, or one white and the other a mulatto or negro, is easily explained. But the facts which have been published most commonly as instances of superfœtation are of a quite different nature; they are for the most part instances of the birth of a child bearing all the marks of a fœtus at term, from two to five months after the birth of a first child, which appeared also to be born at the full term.

M. Raciborski denies the possibility of superfœtation; he affirms that all the cases as yet related in support of the possibility of superfœtation are only cases of twins in which the second child had for a time suffered an arrest of development without ceasing to live. "Whenever the instinct of reproduction," says he, "is completely satisfied, the function which has devolved on the ovaries, that of fabricating ova, and preparing them for deposition, is suspended, whatever be the place then occupied by the fœtus, whether the cavity of the uterus or any other part external to this organ."

We regret we are not able to participate in M. Raciborski's opinion. In the first place, we cannot comprehend this forced explanation, which consists in the supposition of an arrest in the development of the fœtus. That is quite inadmissible. In fact, during all the time of the supposed arrestment, the fœtus continues its relations with the mother. The blood forms, circulates, in fact nutrition goes on, since new aliments for the development of the tissues are always produced. And yet the development, the increase of the tissues is stopped! Why? Truly I see no grounds for admitting such an hypothesis.

Another reason of M. Raciborski is the cessation of the functions of the ovary, consecutive on the presence of a fœtus. "Consequently," says he, "the semen finding no more ovules developed, cannot two or three months after the first fecundation fecundate other germs." But nothing proves this supposed cessation. In the first place, examples abound of women continuing to menstruate during the continuance of pregnancy; the ovaries, consequently, have not ceased to perform their functions. And, on the other hand, researches have established, I think, the presence of ovules more or less developed, or ready to detach themselves, in animals heavy with young, or immediately after parturition. We see, then, the ovaries continuing to perform their functions. Superfœtation, then, does not seem to us impossible, provided the position of the fœtus in the uterus, or the structure of the uterus, (a double uterus for instance), allows the seminal fluid to arrive at the tubes or ovaries.

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* De la puberté et de l'age critique chez la femme. Paris, 1844, p. 487.

In analysing all the works published to the present time, we see that the propositions which the writers have had in view to demonstrate may be reduced to the three following, which form the basis of the new theory of menstruation and fecundation:—

*1st*, The ovules are developed and expelled independent of fecundation.

*2d*, The perfectly developed ovules are expelled at determinate periods—periods corresponding to the rutting season in animals, and to that of menstruation in women.

*3d*, Fecundation alone occurs in the mammalia when perfectly developed ovules meet the fecundating fluid in their passage through the sexual organs.

On this last point there is still some difference of opinion between M. Pouchet and M. Bischoff; the first affirming that fecundation occurs in the uterine canal; the latter stating that he has discovered the presence of semen in the Fallopian tubes and on the ovaries.

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## ART. IX.—*Pathological and Clinical Observations on Encysted Tumours of the Ovary.* By JOHN HUGHES BENNETT, M. D., F. R. S. E., Fellow of the Royal College of Physicians, Lecturer on the Practice of Physic, Pathologist to the Royal Infirmary, &c. &c.

CASES of ovarian dropsy are by no means unfrequent, and their diagnosis and treatment are so confessedly imperfect, that the following observations may not be destitute of practical utility, at a time when the disease, and its cure by extirpation, are strongly engaging the attention of the profession.

The subject of encysted tumours of the ovary has been considerably elucidated by numerous writers, but more especially by Hodgkin, Seymour, Bright, Cruveilhier, and Müller. From these it would appear that the ovary may be the seat, 1*st*, of a simple cyst; 2*d*, of a compound cyst, formed of a capsule containing a number of secondary cysts; and 3*d*, of similar cysts more or less combined with a sarcomatous structure, generally considered of a malignant nature. The first of these seldom becomes larger than an orange, and is for the most part only detected after death. The two latter frequently reach a large size, and contain several gallons of fluid, constituting what has been called ovarian dropsy. In these cases the accumulation of fluid sooner or later interferes with the process of respiration, so as to render paracentesis necessary. This operation is repeated again and again at shorter intervals, until the patient sinks. On dissection death is found to have been occasioned by peritonitis, by suppurative inflammation within the sac, or by exhaustion.

*The source of the fluid*, removed by tapping in ovarian dropsy, has not hitherto been determined. On some occasions it exists within the cavity of the abdomen, and the tumour can be felt to move or float in it, at others it is confined within the cyst. Thus some have conceived the fluid to be ascitic, that is, dependent on some lesion in the peritoneum. In the case of Fleming,* it was argued that the removal of the tumour could not for this reason cure the dropsy; and yet in most of the successful cases of ovariotomy more or less fluid has been found to exist in the peritoneal cavity.

The first case that pointed out to me the true origin of the fluid was the following:—

Case 2. *Ovarian dropsy—23 Imperial pints removed by paracentesis—Death by peritonitis—Compound encysted tumour of the right ovary size of a cocoa nut—Round ulceration on its anterior surface—Simple encysted tumour of the left ovary size of an orange.*

Jane Westwater, aged 49, unmarried, was admitted into the clinical wards of the Royal Infirmary, March 12, 1845, labouring under great swelling and tension of the abdominal walls, apparently from ascites. On the 27th the surgical clerk performed paracentesis, by means of an incision, an inch and a-half long, made through the abdominal walls. Twenty-three imperial pints of a clear brownish fluid were removed. A hard oblong tumour could now be felt in the lower part of the abdomen on the right side. On the 29th she complained of pain and tenderness in the lower part of the abdomen; pulse was 90, small and soft; no vomiting. In the evening the pulse became scarcely perceptible, the countenance anxious and haggard. Delirium supervened, and she died at five A. M. on the following morning.

*Sectio cadaveris.*—April 1, one P. M.

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* Case 1. That of Jessie Fleming, reported in the same number of the Journal.

*Head* not opened.

*Chest.*—Pectoral organs, with the exception of firm adhesions between the pleuræ of right side, healthy.

*Abdomen.*—The peritoneal cavity contained about a gallon of turbid sanguinolent fluid, in which floated numerous flocculi of recent lymph. Nearly the whole of the serous surface was covered with recently exuded lymph, which feebly united the intestines to each other. The cavity of the pelvis was occupied by a tumour, the contents of which, as determined by the feel, were evidently partly fluid. It was about the size of a fœtal head, or cocoa nut, of an oblong form, and of a dark-red colour externally, from the numerously distended veins which ramified on its surface. About the centre of the tumour anteriorly was a round perforation, with thickened edges the size of a four-penny piece, through which, on pressing the tumour, a gelatinous milky fluid could be made to flow. This perforation was at least six inches below the incision made into the abdomen to evacuate the fluid. On removing the uterus and its appendages the tumour was found to be a development of the ovary, the broad ligament being considerably elongated. The left ovary was expanded into a smaller tumour, about the size of an orange.

On bisecting the larger tumour it was seen to be composed of various cysts, varying in size, the largest being about as large as an orange. They were for the most part filled with a gelatinous milky fluid, but a few contained recently extravasated blood. Between the cysts was a purplish jelly-like substance, which, on pressure, exuded blood, and a milky fluid. The smaller tumour, on being cut into, was found to be composed of a single cyst. It may be seen injected in the University Museum.

*Microscopic examination.*—The gelatinous milky fluid within the cells of the larger tumour contained numerous corpuscles, varying in character and size. Some were one-fiftieth of a millimetre in diameter, containing a nucleus and several minute granules. Others were one-one-hundredth of a millimetre in diameter, more transparent, containing a few granules, and resembling plastic corpuscles. (Fig. 1, *a* and *b*.) These isolated cells were mingled with numerous granules and a few drops of oil. There were also groups of nucleated cells of two kinds, the one flat, hexagonal, or oval in shape, resembling pavement; the other caudate, resembling ciliated epithelium cells. (See Fig. 1, *c* and *d*.) The purplish jelly-like substance surrounding the cysts was composed of a net-work of fine filaments, interspersed with numerous granules, and the isolated corpuscles above described.

*Remarks.*—It must be evident that the amount of fluid removed by tapping, namely 23 imperial pints, could not be contained within a tumour the size of a fœtal head Neither could this fluid have been the result of peritonitis, as although brownish, it was clear, and the lymph found exuded after death was evidently recent. Again, as the liver and other abdominal viscera were healthy, there was no reason to suppose that the dropsy was owing to venous congestion. It must be concluded, therefore, that the fluid was secreted within the tumour, and passed into the general cavity of the abdomen through the opening in its walls formerly described.

It was at first considered that the perforation discovered in the tumour was caused by a puncture, but its round and thickened margin, its distance from the external wound, and the mode in which that wound happened to be made, viz. by incision instead of with a trochar, forbade such an opinion. We must then consider the opening described as an ulceration, occurring in the walls of the sac. Such ulcerations are very common in the external envelope of ovarian tumours;* and when they occur the peculiar viscous fluid secreted within the cysts of the tumour flows through them, and accumulates between the tumour and the abdominal walls.

This explanation of the source of the fluid, and its situation in the peritoneal cavity applies to the majority of ovarian dropsies. In a few instances, however, adhesions occur between the tumour and peritoneum, preventing this kind of accumulation, as in the following case.

Case 3.—*Ovarian dropsy—Frequent tappings—Death from exhaustion—Large encysted tumour of left ovary, consisting of one multilocular sac, adherent to the whole anterior parietes of abdomen—Complete suppuration within the sac.*

On the 5th of September 1845 I was requested by Professor Simpson to open the body of a lady, who had long suffered from ovarian dropsy, and been tapped several times. She died much emaciated, with symptoms of hectic fever and exhaustion, but without any signs of peritonitis.

*Sectio cadaveris.*—The abdomen was much distended with fluid, forming a round globular swelling, very different from the undefined and uniform enlargement occurring in ascites. A puncture was made into the right and depending portion of the tumour, when its fluid contents gushed out in a continuous stream. About three gallons were taken away altogether, the first portion coming off resembling clear coffee, and the latter dirty yellow pus. On opening the abdomen it presented one large cavity, lined throughout with a layer of flocculent purulent lymph, of the same dirty yellow colour as the fluid removed. None of the viscera could be seen. It was soon evident that I had opened a large sac connected with a jelly-like substance of a cauliflower form, about the size of the fœtal head, situated immediately under the false ribs on the left side. The sac was closely adherent to the anterior wall of the abdomen throughout, by somewhat tenacious adhesions, which, however, could easily be torn through. I carefully separated these adhesions, and, with the exception of the first incision, removed the sac entire. It was not adherent posteriorly. The jelly-like tumour was developed in the left ovary, and by the expansion of the sac, and elongation of the broad ligament had been drawn into the situation described. The uterus and right ovary were healthy. On removing the morbid structures the intestines and abdominal viscera were brought into view, which, although displaced from their natural position by the tumour, were in structure healthy.

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* See case of Jessie Fleming.

I had no time to make a very minute microscopic examination of the morbid structures, as they were sent to the college museum, and immediately injected by Mr Goodsir. I satisfied myself, however, that the jelly-like mass was wholly composed of primitive filaments, mixed with granular exudation corpuscles, and patches of pigmentary deposit, (Fig. 2.)

Seven preparations were made from the diseased structures in this case, which may be seen in the university museum, and exhibit the following facts:—

1. A portion of the sac, almost healthy in structure, showing the bands and imperfect septa which give these tumours internally a multilocular appearance.

2—5. Four portions of the sac injected, showing the different degrees of suppurative inflammation, and of vascularity, in various parts of the sac internally.

6. Shows the expansion of the broad ligament over the external wall of the tumour, its elongation, and the fimbriated extremity of the Fallopian tube enlarged and standing out from the morbid growth. The uterus and opposite ovary are seen to be healthy.

7. A portion of the jelly like tumour attatched to the internal and thickened membrane of the sac, partially separated from the fibrous envelope. It now resembles a mass of flakes and membranes, into which the injection has scarcely penetrated. A cyst, the size of a walnut, may be seen cut through and attached to the sac, at the lower part of the preparation.

*Remarks.*—In this case the adhesions anteriorly and laterally, and the support given to the tumour posteriorly, had prevented pressure from within being so directed as to cause ulceration in the external sac. Internally, however, nearly all the cysts had burst into each other, and the tumour presented the last stage of development of these growths, viz. one enormous cavity with the traces on its internal surface of previous cysts. Under these circumstances, inflammation followed by suppuration took place; no peritonitis occurred, and she died exhausted.

The following is another instance of the disease, which went through all its stages.

Case 4.—*Ovarian Dropsy—Several tappings—Death by perito-*

*nitis—Tumour of left ovary consisting of one multilocular sac—Various adhesions—Partial suppuration within the sac.*

Elizabeth Hayden, aged 23, unmarried, entered the Royal Infirmary March 17, 1845, and was treated successively by Dr Alison and Dr Christison.

The abdomen was first perceived to enlarge two years ago. She entered the Carlisle Infirmary, where, six months after the commencement of the swelling, paracentesis was performed. Since then she has been tapped twice.

On admission, her general appearance is that of perfect health. She complains, however, of occasional lancinating pains in the right iliac region. The abdomen is much enlarged, with distinct fluctuation; urine scanty. On the 28th paracentesis of the abdomen was performed, and nine imperial pints of very tenacious, transparent, colourless fluid were withdrawn. It closely resembled white of egg. On the 31st of May she complained of severe pain in the abdomen and back, and some vomiting of bilious matter. There was tenderness of the right hypogastrium, and the descent of the diaphragm was impeded. She was relieved by bleeding and antiphlogistics, but the pain returned on the 2d of June, accompanied by bilious vomiting. These attacks of pain, tenderness of abdomen, and vomiting, continued with more or less intermission, until July 1st, when she was again tapped, and thirty-five lbs. of glutinous fluid of specific gravity 1010 drawn off. July 7th, a firm tumour could be felt, most distinct immediately above the umbilicus. The pain and tenderness now increased, but were occasionally relieved by leeches. The vomiting, which was very distressing, ceased on taking a naphtha mixture. A marked change has occurred in her general aspect since the last tapping. On the 22d she had become much debilitated; her healthy condition has disappeared. The countenance is now pale, anxious, and haggard. There is great general emaciation. The pulse is frequent and feeble. On the 24th her sister conveyed her to Carlisle in a very exhausted state, where she died August 18th. Dr Thomas Elliot of that city has kindly informed me that the symptoms which preceded death were most excruciating suffering, a feeling as if something had given way or "burst" in her bowels; and a diminution of size and softening of the abdomen. Shortly after the occurrence of these sufferings, she fell into a state of collapse, the pulse could not be felt, and she sunk rapidly.

*Sectio cadaveris.*—The incision into the abdomen opened a large cyst developed in the left ovary. It contained about two gallons of greenish pus, mixed here and there with a transparent glairy fluid. On attempting to remove the whole morbid structure, it was found to be adherent to the transverse arch of the colon and great omentum posteriorly; and to the peritoneum lining the anterior wall of the abdomen anteriorly. The peritoneum generally was much inflamed and thickened, and its cavity contained a quantity of the same fluid as was found within the cyst. The bowels, uterus, and opposite ovary were healthy. The tumour was sent by Dr

Elliot to Professor Simpson. It was injected by Mr Goodsir, and the preparation may now be seen in the University museum.

This preparation exhibits one-half of an encysted tumour of the left ovary, with its relation to the healthy uterus. It is of an ovoid form, about fourteen inches long and ten broad. Internally three large sacs formed by imperfect septa may be seen, with several smaller cysts, size of walnuts, attached to the sac. The lining membrane resembles a mucous surface, and has evidently in some places been the seat of suppurative inflammation. In these portions the injection may be seen to have penetrated much more freely than in other parts of the sac. Externally the fibrous structure of the external envelope may be seen injected. The Fallopian tube and broad ligament much elongated, the latter apparently expanded over the tumour.

*Remarks.*—In this case we have an excellent opportunity of studying the symptoms in connection with encysted disease of the ovary. It is particularly worthy of remark, that the general health and constitution continued good up to the period when inflammation of the cyst occurred. The girl, when I first saw her in the clinical ward of the infirmary, presented all the appearances of perfect health. The same was observed in the case of Fleming (Case 1), and this notwithstanding the tumour, in both instances, had become greatly developed, and rendered tapping necessary several times. When this case in conjunction with others is considered, it is very probable that the deterioration of the general health commences with the inflammation and suppuration set up within the sac. Large quantities of blood plasma must necessarily be poured into the cyst, which is converted into pus. The mass of the circulation thus drained of its nutritive matter, is not so well able to supply the other wants of the system, and hence the cachectic appearance, emaciation, and exhaustion which generally precede death. The tumour furnished a valuable specimen of the disease in its latter stage, when nearly all the secondary cysts had opened into one large cavity.

*The mode of growth and structure of encysted tumours of the ovary* may, I think, be inferred from the cases now narrated, together with the facts previously ascertained by others.

In all the specimens of the disease I have examined, whether only the size of a walnut, or so large that it has entirely filled the abdomen, the original form and structure of the ovary has disappeared. Whether a new growth is produced, or, as has been supposed by some, the Graafian vesicles are enlarged, and thus originate the tumour, is not yet determined. I am inclined to adopt the latter opinion, and to think also that the external capsule is formed by the thickening and extension of the serous membrane which covers the organ. Sooner or later the enlarged ovary is found to consist of a dense fibrous envelope or sac, containing internally numerous secondary cysts attached to its walls. As the tumour developes itself these cysts become larger, more numerous, and crowded together. Each individual secondary cyst contains a clear glairy or gelatinous fluid, and is composed of a firm fibrous capsule, lined by a smooth membrane. On making a thin section completely through one of these cysts, its greatest thickness will be found, on a microscopic examination, to be composed of fibrous tissue, lined internally by a delicate membrane covered with epithelial cells. The whole are richly supplied with blood-vessels.

As the tumour enlarges it ascends from the pelvis where it was originally confined, and occupies more and more of the abdominal cavity. The Fallopian tube and broad ligament become elongated. The fimbriated extremity of the former is sometimes obliterated, at others stands out from the morbid mass. Sometimes the tumour forms adhesions externally, more or less extensive to the peritoneum, omentum, colon, or neighbouring viscera. At others it floats loose in a fluid within the abdominal cavity.

Meanwhile the internal cysts press upon each other, they become distended with fluid, the blood-vessels are compressed, and in such places further growth is checked. In consequence of this absorption of their structure occurs, and one or more open into each other, as was pointed out by Hodgkin, constituting a multilocular cyst. Occasionally the pressure acting upon the external sac causes it to become thinner and thinner, until at length perforations are produced through which the fluid contents of the cyst escape into the abdominal cavity. Thus relieved from pressure the margins of these perforations become once more vascular, and of considerable thickness, often resembling the round perforating ulcer of the stomach so well described by Cruveilhier. Under such circumstances the internal membrane of the cyst continues to secrete, and pour its fluid into the peritoneum, rendering paracentesis necessary. At other times no opening in the sac takes place, the secondary cysts burst or open into each other, so that after a certain period three, two, or only one cavity may remain, with bands stretching across, forming imperfect septa in, or a few small cysts attached to the internal wall, clearly indicating its original structure. In either case, sooner or later, suppuration is in most instances established within one or more cysts, or within the external sac itself. This suppuration seems to occur in some cases by the formation of pus corpuscles in the gelatinous matter; in others, by inflammatory action attacking the walls of the cyst or sac, leading to fresh exudation, which is afterwards converted into pus. The patient does not long survive this occurrence. If ulceration have taken place in the external wall of the tumour, peritonitis is generally induced, if not the patient sinks exhausted, whether the pus be evacuated or no. Occasionally more or less blood is extravasated into the inflamed cysts, which, with the various stages of suppuration, cause the sanguinolent, coffee-like, or purulent fluid so often observed.

The gelatinous contents of the cysts vary greatly in different cases, in some being diffluent, in others glairy like white of egg, whilst in many it is semi-solid, resembling coagulated calve's-foot jelly, or strong size. When fluid it frequently contains flocculi, which are patches of epithelial membrane, more or less united together by granular matter. When gelatiniform it often contains faint oval corpuscles, or a few primitive corpuscles. Occasionally an opalescent or opaque creamy appearance is communicated to the jelly by the formation of pus corpuscles or minute granules, and sometimes it is wholly filamentous mixed with granular cells and other products of inflammation.

This jelly-like matter when consistent presents all the characters of coagulated *liquor sanguinis*, which has not yet passed into organization. Acetic acid developes in it, or causes to be precipitated a white membrane having all the characters of fibrous tissue. Frequently granules, cells, and filaments may be observed in it in various stages, as is the case with recent exudation from the serous membranes, or in other simple forms of hyaline blastema.

I must remark before leaving this part of the subject, that the above description only refers to encysted tumours of the ovary, uncomplicated with hairy or other growths, osseous deposits, or cancer, a form of disease much less common in this situation than is generally supposed. In the great majority of cases an encysted tumour of the ovary must be considered as an alteration of structure purely local in its nature.

The *diagnosis* of ovarian and abdominal tumours generally is very defective, so much so indeed as in one case to have led to the opening of the abdomen, when no tumour existed, and in many others to the performance of an operation when, from adhesions or other causes, the tumour could not be removed. In all diseases of this kind there are two questions which every practitioner desires to answer with certainty, namely 1st, what is the *seat*, and 2d, what is the *nature* of the tumour? Now, in addition to what is already known on this subject, and the means generally recommended for forming a diagnosis, there are two other methods of investigation which seem to me capable of greatly assisting the practitioner in his efforts to form a correct opinion of the case. There are, 1st, an employment of the uterine sound, recommended by Professor Simpson, and 2d, a microscopic examination of the fluid removed by paracentesis.

1. With respect to the uterine sound I need only refer the reader to the excellent paper in which Dr Simpson described it.[*] Therein is detailed how, by fixing the body of the uterus, and by elevating, depressing, or bringing forward the handle of the instrument, both the anterior and posterior portions of the fundus may be felt with the left hand above the pubis, through the integuments. In cases of ovarian dropsy the information thus arrived at is negative, but this becomes of immense importance when the question arises, (as it always does,) is the tumour uterine or ovarian? In the case of Fleming this point was anxiously debated, but when on the introduction of the sound the fundus of the uterus could be distinctly felt above the pubis presenting its usual rounded character, there could no longer be any suspicion that the tumour originated in that organ. Again by pushing the uterus from side to side, we are enabled to act upon the ovaries, and to determine by the impulses communicated to the hand, whether the tumour be on the right or left side, and to form a tolerable idea, in certain cases, whether it be free or attached. By means of this instrument then we are materially assisted in resolving the first important question regarding the *seat* of the tumour.

2. The microscopic examination of the fluid removed by paracentesis has only so far as I am aware been made by myself, and the results are of a nature which it appears to me are capable of being made highly serviceable in diagnosing the *nature* of the tumour. The observations I have now to describe must only be considered as a contribution, intended to direct the attention of practitioners to this subject, and not as a complete investigation from which positive results should be drawn. These cases, though far from uncommon, are brought too seldom under the notice of one individual, to enable him without assistance to complete the inquiry.

In the fluid removed by paracentesis from Jessie Fleming, it has been previously described (see page 280) that several flocculi existed. These when examined with the microscope were found to be composed not of lymph, as was at first supposed, but of numerous cells, varying in size from the one one-hundredth to one-fortieth of a millimetre in diameter. The great majority were about one-fiftieth of a millimetre. They were slightly granular, of round and oval shape, unaffected by water, but becoming more transparent on the addition of acetic acid, and exhibiting a distinct nucleus about one-one-hundred and fortieth of a millimetre in diameter. The nucleated cells were imbedded in a granular matter, which could easily be broken down. (See Fig 3.) From this description it will be at once perceived that these corpuscles resembled those which constitute the epithelial surface of certain membranes.

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[*] London and Edinburgh Monthly Journal, 1843, p. 701.

After the operation on Fleming, I examined the cysts found in the ovary with great care. They were each lined by a delicate membrane, covered with nucleated epithelial cells, some round or oval, and others many-sided from contiguous pressure. (See Fig. 4.) I could find little difficulty, therefore, in identifying the corpuscles seen in the fluid removed by paracentesis, with those observed lining the cysts, and it became evident that masses of these had separated, and floated into the abdominal cavity, through the perforations in the external sac as previously described.

In a second case (Case 4) I found similar cells thinly scattered, which was probably owing to my having examined a portion of the fluid first drawn off, instead of the last portion removed, which usually contains more of the flocculi.

In a third case, in which paracentesis was performed, and where the fluid removed was sent to me by Dr Simpson, I could discover none of the corpuscles just alluded to, but only shapeless flakes, mixed with numerous granules. After death the ovarian tumour was found to be fibrous throughout.

In a fourth case the fluid removed was sent to me by Dr Handyside. It was slightly turbid and viscid, and contained numerous yellow flocculi which sank to the bottom of the vessel. In these I observed the following appearances, *1st*, Numerous transparent cells, containing several granules, and in some of which there was a distinct nucleus. They varied greatly in size, some being so small as the $\frac{1}{100}$th, and others so large as the $\frac{1}{20}$th of a millimetre in diameter. They were intermixed with numerous granular exudation cells, such as are observed in inflammatory softenings. (Fig. 5.) Some of these (*a*) were partly dissolved on the addition of acetic acid, the others were not affected. *2d*, Numerous oblong cells grouped together, and imbedded in a finely granular matter. They varied from the $\frac{1}{15}$th to $\frac{1}{25}$th of a millimetre in their longest diameter, and were granular throughout. (Fig. 6.) *3d*, Granular masses varying in size and shape, yet bounded by distinct lines. (Fig. 7.) *4th*, Numerous transparent cells resembling young fat vesicles. (Fig. 8.)

The woman from whom this fluid was taken is still living, yet I had no hesitation in pronouncing from the above examination that she laboured under an encysted tumour of the ovary, an opinion which on examination of the case with Drs Simpson, Handyside, and Burn, and the employment of the uterine sound fully confirmed.

In another and fifth case, where I examined the fluid removed by Dr Simpson, the most positive evidence was afforded me of testing the accuracy of this means of diagnosis. The cells were similar in character to those formerly mentioned, combined with the debris of a fibrous structure, which induced me to suppose that the external envelope of the tumour was in a state of decomposition. In this case Dr Simpson was not permitted to use the uterine sound, but from an external examination of the tumour, diagnosed a fibrous growth from the uterus. I myself examined the woman, and found a firm, resistant and immovable tumour, occupying the centre of the abdomen, and producing a to-and-fro friction murmur with the respiratory movements. The difficulty of forming the diagnosis in this instance, however, as well as the extreme value of the case itself in other respects, demands that it should be placed on record. This I am enabled to do through the kindness of Dr Woodhead, whose case it was. I myself performed the examination after death, and examined the morbid structures removed with extreme care.

Case 5.—*Firm and attached tumour of the abdomen—Paracentesis performed once—Death by exhaustion—Compound encysted tumour of both ovaries—Sloughing of the fibrous sac of the left ovarian tumour—Colloid cancer of omentum and peritoneum.*

Mrs K. aged 28, had no children, consulted Dr Woodhead in October 1845, considering herself to be in a pregnant state. She thought that she had been in the family way about seven months; during which time, however, the catamenia had appeared regularly, but were scanty. There was a visible enlargement of the abdomen, but no particular examination was made. In November she complained of pains in her back and abdomen, and passed very restless nights. These symptoms were treated by palliatives, and attributed to the spurious pains so common in advanced pregnancy. In the beginning of December an examination of the abdomen was made, which was considerably enlarged, so much so as to resemble a woman about the 8th or 9th month of utero-gestation. A distinct fluctuation was perceived, and an indurated tumour which remarkably resembled a fœtal head. About the commencement of January 1846 she was examined *per vaginam*, when the *os uteri* was felt unusually high, which led to the suspicion that she was not pregnant. At this time the peritoneal fluid was much increased in amount, and the abdomen was very tense. The respiration was considerably embarrassed, and the nights rendered restless from dyspnœa. About the middle of January Dr Simpson was consulted, who diagnosed a fibrous tumour of the uterus. The following day paracentesis was performed at the umbilicus, which was unusually prominent, and a wash-hand basin full and a half of fluid was drawn off. This fluid was of a reddish colour, and contained numerous flocculi and white nodules. The former were seen on a microscopic examination to be composed of numerous corpuscles, both nucleated and granular similar to those formerly described, entangled together in groups by numerous filaments. There were also numerous blood globules. (Fig. 9.) The white nodules were entirely composed of filamentous tissue, containing several fusiform corpuscles.

The breathing was much relieved by the tapping, but from this time she could not carry on her usual occupation, which she had hitherto done. The pains in the back and abdomen continued: a febrile action was excited; the pulse rose to above 100; the nights continued restless; no vomiting; and a cachectic state made its appearance. The wound did not close, but continued to discharge a reddish fluid, which afterwards became dark, often mixed with flocculi, and latterly with a quantity of jelly-like substance. About the second week in February the tumour was felt hard, unequal on the surface, and apparently attached to the parietal walls of the abdomen anteriorly. On placing the ear over the abdomen a distinct to and fro friction murmur could be heard. Fluctuation could also be felt at the lower part of the abdomen. Two other openings now took place in the umbilicus, from which a continual discharge escaped. The other symptoms continued; the pains could only be relieved by morphia, and she sunk exhausted on the morning of March 8.

*Sectio cadaveris, March* 9, 8 P. M.

The body was much emaciated.

The thoracic organs were healthy.

*Abdomen.*—On cutting through the peritoneum, about a pint of dirty yellow purulent fluid escaped. The pelvis and abdomen inferiorly were occupied by an encysted tumour, which had burst anteriorly, exposing several cysts containing an amber-coloured jelly-like matter. The peritoneum superiorly and interiorly was united to a firm tumour underneath, by gelatinous adhesions, which were easily broken through. This tumour occupied the whole breadth of the abdomen, and extended from the ensiform cartilage to midway between the umbilicus and pubes. It varied in thickness from one to two inches, and was evidently a degeneration of the omentum, being attached superiorly to the stomach and transverse colon, lying over the intestines, and terminating inferiorly in a rounded edge. When removed from its attachments the tumour weighed 3 pounds 13 ounces. To its anterior and posterior surface were attached numerous shreds and patches of chronic lymph. On cutting into it in various directions, it presented numerous cells, varying in size from a pin's head to that of a large pea, filled with a clear, glistening, gelatinous matter, surrounded by a firm fibrous substance or mesh-work. In some places it was of a greenish hue, in others of an ochrey or orange yellow. Here and there the meshes of the tissue were tinged of a grayish hue by black pigmentary deposits.

The peritoneal membrane lining the abdominal parietes was coated with a layer of the same colloid cancer about two lines in thickness, covered with patches and flocculi of lymph. This layer could in many places be stripped from the serous membrane below, which appeared to be healthy. Between the liver and diaphragm a mass existed half an inch thick. The spleen was surrounded by a similar layer. The lymphatic glands in the neighbourhood of the pancreas and stomach were much enlarged, and apparently quite converted into the colloid cancer. A mass surrounded the uterus more than an inch thick, circumscribing the cavity of the pelvis. The lumbar glands and *appendicæ epiploicæ* of the large intestines were greatly enlarged and similarly affected. On cutting into the liver, spleen, and kidneys, they were found healthy; the peritoneal membrane covering them being alone affected. The peritoneum surrounding the pyloric extremity of the stomach, and extending a third over the surface of that viscus, was upwards of an inch thick from deposit of colloid cancer. Its muscular and mucous coats were healthy. The small intestines were united together by bands of chronic lymph, of a bluish-black colour from pigmentary deposit. Anteriorly they were covered *en masse* by a layer of lymph, of greenish colour, about a line in thickness.

Both ovaries were the seat of a compound cystic tumour, that on the left side was in circumference about the size of the crown of a hat. When viewed anteriorly, it presented the appearance of a mass of trembling calve's-foot jelly, with numerous blood-vessels ramifying upon it. Shreds of the external sac were seen attached to it here and there, which had evidently sloughed, and in some places been adherent to the abdominal parietes. Posteriorly the fibrous sac was still entire, and presented numerous rounded elevations, marking out the forms of distinct cysts. On incising this mass, it was found to consist of numerous cysts, the walls of which were very thin, but richly supplied with blood-vessels. They for the most part contained a trembling, transparent, gelatinous substance, generally of an amber colour, but here and there of a brownish-red. Imbedded in some of this jelly, there existed opaque white masses, resembling blanc-mange, or thick cream. In other places the gelatinous matter might be observed semitransparent and of a light yellow colour.

The tumour of the right ovary was about the size of a small orange. In the fibrous capsule anteriorly was a round perforation the size of a four-penny piece, from which a similar amber-coloured jelly could be squeezed as existed on the opposite side. On section it was found entirely full of cysts, all filled with the same gelatinous matter.

*Microscopic examination.*—The colloid cancer was composed of the usual structure of such growths, which need not be described here.

The amber-coloured transparent jelly within the cysts at first appeared to be structureless. On careful examination, however, with the rays of light directed obliquely, very faint cells could be distinguished of an oval form, varying in their longest diameter from the $\frac{1}{80}$th to the $\frac{1}{25}$th of a millimeter in diameter. Some of these were distinctly nucleated. A few oily granules could also be seen isolated and in groups. (Fig. 11.)

The white opaque creamy matter in the cysts was entirely composed of minute granules and molecules, united together by delicate filaments. These granules were of two distinct sizes. Those in one group being generally about the $\frac{1}{300}$th, those in the other being about the $\frac{1}{500}$th or $\frac{1}{700}$th of a millimeter in diameter. These granules were densely grouped together, and in some places constituted granular masses, similar to those seen in inflammatory exudation. (Fig. 13.)

In the light yellow semitransparent gelatinous matter delicate filaments could be seen crossing each other, together with numerous faint cells, round in shape, about the size of pus corpuscles, containing from one to six granules. (Fig. 12.)

The walls of the cysts themselves were composed of fibrous tissue, more or less covered with numerous granules. In a few places only could granular cells be seen. (Fig. 14.)

The dirty yellow purulent matter was composed of broken down pus corpuscles, mixed with innumerable granules and molecules.

The lymph attached to the omental tumour and parietal walls was composed of filamentous tissue, interspersed with the same broken down corpuscles and granules just alluded to. It was also studded over with a large number of crystals of the triple phosphate. (Fig. 15.)

*Remarks.*—A perusal of this case must convince every practitioner of the extreme diagnostic difficulties it presented. At first the enlargement of the abdomen was supposed to depend on pregnancy both by the patient and her medical attendant. When a suspicion of disease was excited, the attention was naturally fixed on the indurated tumour, that dissection afterwards discovered to be colloid cancer of the omentum. It was supposed to be a fibrous tumour of the uterus. Had the sound been used I feel satisfied that this error would have been avoided. The patient, however, would not allow Dr Simpson to make an examination. Under these embarrassing circumstances, a microscopic observation of the fluid removed by paracentesis exhibited the same structures seen in cases of undoubted ovarian dropsy, and it appears to me a strong proof of the utility of such observation, that an encysted tumour in each ovary was afterwards found to co-exist with the cancerous disease.

The case is further interesting as presenting perhaps the most extensive deposit of colloid cancer on record. Small fragments of it came away with the fluid, which presented the fibrous tissue of the areolar structure which enters into its composition. But as any observations on the cancer itself would be foreign from the subject under consideration, I forbear to enter upon them at present.

There can be little danger of our confounding the fluid accompanying encysted ovarian disease from that found in inflammatory or passive dropsies. In peritonitis we find primitive filaments mixed with plastic or pus corpuscles,* which can never be mistaken for the large epithelial cells observed in the fluid of ovarian dropsy. In accumulations of fluid caused by diseased liver, I have not detected, when uncombined with inflammation, any structures whatever. A comparative diagnosis, however, from an examination of the effused fluid, requires farther researches, which I shall soon have ample opportunities of entering into.

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* See plate in the writer's Treatise on Inflammation.

As regards *treatment*, the anatomical examination of encysted tumours of the ovary must convince any one, that they are not curable by internal medicines. The idea that a dense fibrous envelope, containing numerous secondary cysts, all richly furnished with blood-vessels, can be absorbed through the agency of mercury, iodine, or any other drug, must be purely imaginary. There is not one positive fact to support such an opinion. Neither can it be supposed from what has been described of the mode in which these tumours are developed, that so long as any of the cysts remain intact, a cure can be hoped for. But we have seen that the natural course of these secondary cysts is to open into each other, until at length only one large cyst remains. Under such circumstances it may be conceived that a rupture might, by exciting inflammation, and thus destroying the secreting surfaces, or inducing adhesions between them, cause a radical cure of the disease. Such is probably the explanation of those rare cases, well established in science, which have apparently burst, and rapidly disappeared. A recent case of this kind has lately been recorded by Lebert,[*] of which the following is a condensation :—

Case 6. *Ovarian dropsy—Rupture of the cyst by a fall—Peritonitis —Permanent cure.*

Madame S——, aged 46, of good constitution, first perceived a tumour on the left side of the abdomen in 1836. In the summer of 1837 it had acquired the diameter of a " decimetre," and felt elastic. The volume of the abdomen gradually increased The hardness became general. The urine contained a deposit which she likened to white of egg. At length the abdomen became so large that she resembled a pregnant woman. The catamenia had ceased for several years.

At the commencement of last April, (the year is not stated,) the patient, when sitting on a grassy bank, voluntarily rolled down the declivity. At the moment she arrived at the bottom, although the descent was neither rapid or steep, she experienced a very violent pain, a desire to vomit, impeded respiration, and could not move. The pains in the abdomen were continued, and violent for two days. The volume of the abdomen increased rapidly, and it became tympanitic. She had frequent vomiting, shrunken features, and for twenty-four hours the pulse could scarcely be felt or counted. On the third day, after the active use of antiphlogistics, the pulse became less frequent, the abdomen diminished in volume, and a fluctuation could be distinctly felt in it below the umbilicus. By degrees the fluctuation diminished, and at the end of some weeks, during which the convalescence went forward without accident, all signs of the effusion had entirely disappeared. It was now ascertained that no tumour existed, and she has since enjoyed good health.

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[*] Physiologie Pathologique, Tome ii. p. 71.

The records of medicine will be found to furnish many cases like the above. As I am not aware that any subsequent *post mortem* examination of individuals thus recovering from ovarian disease has ever been made, the exact mode of cure is not ascertained. In the majority of such cases, however, it will be observed that the progress of the morbid growth has been chronic, that consequently time has been allowed for all the secondary cysts to open into each other, and that the inflammation which follows the rupture may then be supposed to act by obliterating or causing adhesions between the walls of the cyst, as in the case of hydrocele. When, on the other hand, rupture of the external sac takes place, whilst some of the cysts remain entire, the termination in cure is impossible, and the peritonitis occasioned more frequently causes death.

It is astonishing how some individuals accommodate themselves to very large abdominal swellings. I have known more than one case where the patient has laboured under an enormous encysted tumour of the ovary for ten and even fifteen years. On the other hand, the cases detailed in this paper are sufficient to show that when once paracentesis is had recourse to as a palliative measure, suppuration within the cysts, and a cachectic state of the constitution more rapidly supervene. One important practical rule, therefore, to be followed in the treatment of these cases is, not hastily to have recourse to tapping, but by all possible means of delay, to further the natural disposition which the internal cysts exhibit, under pressure, of forming one large sac. This once accomplished, there is nothing inconsistent in supposing that inflammation produced artificially is capable of producing a permanent cure as well as a spontaneous rupture. There is every reason to suppose that artificial pressure is capable of facilitating the absorption of the walls of the secondary cysts, and their opening into each other; but we possess no means of ascertaining when only one sac is produced. That it has succeeded in obliterating and ultimately curing the disease, however, has been proved by Mr Isaac Brown,[*] whatever other opinions may be held respecting the propriety of his treatment.

Whether treatment by pressure should be tried, or whether ovariotomy should be had recourse to, will depend on the nature of the case. If the tumour have contracted extensive adhesions, the first plan is indicated. If it be free, the patient young, and of good strength, excision is more likely to be attended with success. Further experience can alone decide on the propriety of either proceeding. At present, it may be said, from the degree of success which has attended both methods, that it is not likely cases of ovarian dropsy will in future be considered as beyond the reach of art, and that before long we shall be furnished with sufficient data to render our practice less empirical and more rational than heretofore.

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[*] See cases recorded in the Lancet.

### *Description of the Plate.*

All the figures are drawn as seen under a magnifying power of 230 diameters linear.

Fig 1. Structures found in the fluid squeezed from the right ovarian tumour, Case 2. *a* large nucleated cells, *b* small nucleated cells, *c* pavement epithelium, *d* caudate cells, *e* drops of oil.

Fig. 2. Structure of jelly-like substance in the ovarian tumour, Case 3. *a* finely filamentous substance, in which several granules and plastic corpuscles are visible, *b* exudation granular mass, *c* exudation granular corpuscles, *d* pigmentary deposit.

Fig. 3. Structure of the flocculi which floated in the fluid removed by paracentesis, in the case of Jessie Fleming, Case 1. *a* as seen without reagents, *b* after the addition of acetic acid.

Fig. 4 Structures taken from a cyst the size of a marble, in the left ovarian tumour of Jessie Fleming, Case 1. *a* pavement epithelium, *b* nucleated corpuscles in the fluid of the cyst.

Fig. 5. Structures seen in the fluid removed by paracentesis of a woman now labouring under ovarian dropsy. *a* cells containing granules, *b* younger similar cells, *d* cells which from endosmosis have become unusually large and transparent, *e* exudation granular cells.

Fig. 6. Large granular cells seen in the same fluid, imbedded in, *a*, amorphous granular matter.

Fig. 7. Granular matter enclosed within distinct lines, more probably of filamentous than of cellular origin, in the same fluid.

Fig. 8. Group of simple transparent cells from the same fluid.

Fig. 9. Structures seen in the fluid removed by paracentesis, Case 5. *a* nucleated corpuscles, united in groups by *b* primitive filaments, *c* nucleated cells rendered large and transparent by endosmosis, *d* simple transparent cells, *e* blood globules, isolated, in rolls and masses.

Fig. 10. The nucleated cells of the last figure, seen after the addition of acetic acid.

Fig. 11. Delicate oval corpuscles seen in the clear amber jelly-like matter found within the cysts of the left ovarian tumour, Case 5. They were only made visible when the light was directed obliquely.

Fig. 12. Delicate primitive filaments, and corpuscles seen in the semi-opaque yellow jelly-like matter of the same tumour.

Fig. 13. The granules of two medium sizes, seen in the white creamy opaque matter within the cysts of the same tumour; at *a* they were gathered together so as to resemble exudation granular masses.

Fig. 14. Fibrous structure, covered and interspersed with granules forming the walls of the cysts, in the same tumour; a few nucleated cells were also visible.

Fig. 15. The structure of shreds of lymph, hanging to the external sac of the same tumour, and to the surface of the colloid cancer in Case 5. *a* broken down pus or plastic corpuscles, *b* crystals of the triple phosphate.

# PART II.

## CRITICAL ANALYSIS.

### Art. I.—*Friedrich Tiedemann, Von der Verengung und Schliessung der Pulsadern in Krankheiten. Mit Drei Tafeln.* Heidelberg und Leipzig, 1843. 4to. Seite 316.

*On Arctation and Closure of the Arteries in Disease.* By Frederick Tiedemann, Professor of Anatomy and Physiology at Heidelberg. With Three Plates. Heidelberg and Leipzig, 1843. (Continued from No. 166, pp. 163.)

We resume the examination of this work at the point at which we stopped last article.

The reader's attention is first called in this division to

*Contraction and closure of arteries from swellings of different sorts in the neighbourhood of arteries.*

Besides aneurisms, there may be formed in the neighbourhood of arteries other tumours, which may exert pressure and cause inflammation. Lymph is effused within their canals, and they are agglutinated and completely obliterated. This is most frequently produced by morbidly enlarged and indurated lymphatic glands, either in struma or in malignant diseases and in cancer. The great size which lymphatic glands sometime attain is well known. Professor Tiedemann saw in the anatomical collection of the College of Surgeons at Dublin in a case of cancer of the lip the lymphatic glands of the lower jaw enlarged to the size of a small apple. In like manner, in cancer of the mamma the axillary glands become greatly enlarged; and in a case of cancer of the anus and rectum the inguinal glands were swelled and indurated, and had acquired the size of an orange.

He then refers for examples of obliteration of arteries from pressure by lymphatic glands to the cases given by Lardner, Taunton, Velpeau, Todd, and Wilmot. He subjoins the cases by Stentzel and Larcheus; we think not very properly; for in the former case the tumours were in the coats of the aorta, and in the latter, so far as it is possible to form a conclusion from the statement, the tumour was a partially healed aneurism. The author thinks that the tumours were probably indurated lymphatic glands. He refers to the cases in which Rahn and Portal found the aorta contracted by induration of the pancreas, and those of enlargement of that gland mentioned by Stoerck and Lieutaud.

Next comes narrowing and closure of arteries from deposit of earthy concretion in their walls. These earthy matters being deposited between the inner and the fibrous coat narrow or close the canal, and thereby cause disturbance in the movement of the blood. Though these deposits are most frequent in the aged of both sexes, they are more common in males than in females; and occasionally they are observed in middle-aged persons and in children. Earthy deposits are most commonly observed in the semilunar valves of the orifice of the aorta; and very generally the deposition begins in the *corpuscula Arantii*, which are enlarged, or it begins at the adherent margin of the valves, and advances progressively to their free edge, until the valves are rendered rigid and immovable; and thus the orifice of the aorta is contracted or changed into a mere chink or slit, while the rigid valves present a great obstacle to the blood proceeding from the left ventricle.

Simultaneously with earthy penetration of the semilunar valves of the aorta, not unfrequently there is earthy deposition in the venous orifice of the left chamber and in the mitral valve. That orifice consists, it is known, of a tendinous ring, from which arise the tendinous chords of the laciniæ, to which are attached the *columnæ carneæ* of the ventricle. That ring has a great tendency to become indurated by the deposition of earthy matter; and by this is the orifice contracted. Often these concretions extend to the apices or tips of the valve, and these spots present rough hard elevations. By the arctation of the left auriculo-ventricular orifice resulting from these earthy concretions, the motion of the blood from the left venous sinus into the left ventricle is impeded, and the blood accumulates in the former and distends it. Of these changes he notices shortly a considerable number of instances, on which, however, it is unnecessary to dwell.

Another cause of arctation and closure of arteries is the presence of clots of blood. These he regards as most common in aged persons, the arteries being then filled with solid fibrinous clots deposited in layers which obstruct the canals like plugs. Such clots are found in arteries in which the walls contain earthy concretions, which have perforated the inner membrane, and with their tips or rough serrated edges project into the canal, where they are immersed in blood. From the blood are deposited flocks of coagulable fibrine, which adhere to the tips and edges of the earthy concretions. With these are united new fibrinous clots; and thus are formed successive layers, which finally entirely fill, obstruct, and close the canal of the artery.

This separation of fibrinous matter from the blood takes place in the same way as happens when a ligature is applied to an artery in a living animal. The fibrinous layers at length form a plug which obliterates the artery. Such results Magendie observed in his experiments.

The fibrinous clots in ossified arteries are most commonly of a dark brown or dark red colour; and they are hard and tough like leather. They are either evidently in layers, or they form a hard curved mass. Sometimes the artery at the points of closure is as if chorded, which then denotes previous inflammation.

In confirmation of these conclusions, he refers to the facts of his tenth case, formerly noticed p. 126, to the case by Goodison, to the case given by Hodgson, p. 78 of present work, and a preparation in the collection of the Dublin College, in which the common iliac arteries were entirely closed, yet without diminution of their calibre.

In the eighth chapter the author considers the causes of adhesive inflammation of arteries, and arctation and obliteration thereby induced. To show that this process with exudation of lymph within their canal, and consequent arctation by contraction or chording, or even complete closure and agglutination, is a disease which may take place at any period of life, and happens as well to the young as to the aged of both sexes, he arranges the cases given in the previous part of the work in the following order in the tabular form. The tables are disposed in five series, according to the nature of the cause or causes inducing constriction, or closure, or agglutination. The numbers in the fourth column indicate the cases as given by the author in the first division of his work.

### I.—*Narrowing, or closure of Arteries from Agglutination with lymph or fibrinous clots.*

| Age. | Sex. | Artery inflamed, contracted, or closed. | Case & authorities. |
|---|---|---|---|
| 3 | | Abdominal part of aorta, iliacs, and left tibial artery closed by solid fibrin. | Nicod, 54. |
| 14 | M. | Aorta closed below left subclavian and the *ductus arteriosus.* | Graham, 48. |
| 15 | F. | Lower part of the aorta to the passage through the diaphragm. | Schlesinger, 46. |
| 17 | F. | Aorta chorded above the *ductus arteriosus.* | Otto, 39. |
| 18 | F. | Thoracic part of aorta narrowed. | Meckel, 33. |
| 18 | F. | All the arteries of the right lower extremity closed by fibrinous clots. | Greene, 88. |
| 21 | M. | Aorta closed below the attachment of the *ductus arteriosus.* | Jordan, 49. |
| 22 | M. | Aorta contracted at the origin of the left subclavian and below the arch, and also above the division into iliac arteries. | Andral, 42. |
| 22 | M. | Pulmonary artery narrowed, partly closed. | Kreysig, 95. |
| 24 | M. | All the arteries inflamed, partly narrowed, partly closed. | Meli, 92. |

| Age. | Sex. | | Cases & authorities. |
|---|---|---|---|
| 27 | M. | Aorta at the junction of the *ductus arteriosus* chorded as if by ligature; the *ductus arteriosus* open as in early infancy. | Law Nixon, 44. |
| 30 | M. | Aorta narrowed and walls thickened. | Meckel, 34. |
| 30 | M. | Left humeral artery obliterated. | Case 3. |
| 33 | M. | Thoracic part of aorta narrowed. | Morgagni, 31. |
| 35 | M. | Aorta below *ductus arteriosus* chorded almost to closure. | Meckel and Herrmann, 40. |
| 36 | F. | Abdominal part of aorta, iliac, pelvic, and femoral arteries closed. | Velpeau, 55. |
| 40 | F. | Aorta narrowed and inner coat occupied by growths. | Morgagni, 30. |
| 40 | F. | Aorta in the region of the diaphragm narrowed. | Morgagni, 31. |
| 40 | M. | Aorta chorded as if by ligature below the arch. | Hargrave, 47. |
| 45 | M. | Chording at the arch of the aorta below the left subclavian artery. | Legrand, 45. |
| 45 | M. | Aorta below the arch narrowed and then completely closed. | Eichler and Romer, 50. |
| 50 | F. | Thoracic part of aorta almost closed. | Paris, 37. |
| 51 | F. | Aorta below renal arteries to division into iliac artery closed by coagulable lymph; the iliac and femoral arteries and the superior mesenteric and lower lumbar arteries agglutinated. | Barth, 58. |
| 56 | M. | Left axillary and humeral artery closed. | Heermann, 2. |
| 57 | M. | Constriction of the aorta and the interior of the *ductus arteriosus*. | Astley Cooper, 38. |
| 58 | F. | Right femoral and popliteal artery closed by blood-clots, walls containing ossification, the anterior and posterior tibial artery and the fibular artery agglutinated. | Cruveilhier, 81. |
| 60 | F. | Right subclavian artery narrowed, and almost occluded by fibrinous clots. | Beauchene, 69. |
| 60 | M. | Upper mesenteric and both superficial femoral arteries agglutinated. | Case 1. |
| 66 | M. | The left common iliac artery, the pelvic artery, the popliteal, anterior and posterior tibial and fibular arteries closed by lymph. | Legrand, 85. |
| 69 | M. | The thoracic part of the aorta below the left subclavian constricted, and in the canal a sort of partition. | Case 9. |
| 74 | F. | Left humeral artery closed. | Rostan, 76. |
| 81 | F. | Popliteal, post-tibial, and fibular artery closed. | Cruveilhier, 90. |
| 92 | M. | Narrowing of the aorta between the left subclavian artery and insertion of the *ductus arteriosus*. | Reynaud, 41. |
| | F. | Orifice of aorta narrowed by constriction, and the semilunar valves agglutinated. | Case 7. |
| | M. | Cœliac artery, upper mesenteric artery, and several intercostal arteries closed by fibrinous clots. | Chaussier, 79. |
| | M. | Right humeral, radial, and ulnar arteries converted into ligamentous chords; right popliteal, posterior, tibial and fibular arteries closed. | Thomson and Turner, 91. |
| | M. | Right humeral artery obliterated. | Ribes, 74. |
| | M. | All the arteries of the lower extremity completely closed by fibrinous clots. | Andral, 87. |

## II. *Occlusion of arteries from adhesive inflammation in consequence of the pressure of aneurism.*

| Age. | Sex. | Arteries closed or occluded. | Cases & authorities. |
|---|---|---|---|
|  | M. | In an aneurism of the arch of the aorta, closure of the innominata and left subclavian arteries. | Darrach, 59. |
| 67 | F. | In aneurism of the aorta the innominata closed. | Solon, 60 |
| Agd. | M. | In aneurism of the ascending part of the aorta, the right carotid and subclavian arteries obliterated. | Carmichael, 61 |
| 50 | F. | Aortic arch, aneurismal, and left carotid arteries agglutinated. | Haller, 62. |
|  |  | Aneurism of the arch of aorta, with closure of right carotid artery. | Astley Cooper, 66. |
|  | M. | Arterial tumour in arch of aorta, and left subclavian artery closed. | Hodgson, 71. |
| 66 | F. | In aneurism of the right subclavian artery, the axillary and brachial artery converted into ligamentous chord. | Pelletan, 72. |
| 40 | F. | In aneurism of the aorta, at the passage through the diaphragm, the coeliac and superior mesenteric artery closed. The right external iliac artery narrowed and closed by a clot. | Fleischmann, 80. |
|  | M. | In aneurism the aorta above the division of the two iliac arteries closed. | Fantoni, 52. |
|  | M. | Abdominal part of the aorta aneurismal, and below the sac agglutinated ; the iliac arteries filled with plastic lymph. | Monro, 56. |
| Agd. | M. | Coeliac artery aneurismal and closed ; also the superior mesenteric artery. | Hodgson, 77. |

## III. *Narrowing and agglutination of arteries from adhesive inflammation by pressure of enlarged lymphatic glands or other swellings.*

| Age. | Sex. | Artery narrowed or closed. | Cases & authorities. |
|---|---|---|---|
|  | F. | Narrowing of internal carotid artery from enlarged lymphatic glands in neck. | Lardner, 67, |
|  | M. | Closure of axillary artery from enlargement of axillary glands. | Taunton, 73. |
| Yng. | M. | Narrowing of abdominal part of aorta and iliac arteries from scrofulous lymphatic glands. | Todd. |
|  | M. | Narrowing of aorta from enlarged and indurated lumbar glands in degeneration of one testis. | Wilmot. |
| 58 | M. | Almost complete closure of abdominal part of aorta from large hard steatomatous tumours. | Stentzel, 29. |
| 33 | F. | Closure of abdominal part of aorta from hard bodies and aneurism of the coeliac artery. | Larcheus, 1. |

## IV. *Agglutination of semilunar valves of the aorta and pulmonary artery in consequence of adhesive inflammation.*

| Age. | Sex. | Valves agglutinated. | Cases & authorities. |
|---|---|---|---|
| 11 | F. | Agglutin. of semilunar valves of pulmonary artery. | Urban, 104 |
| 15 | F. | do. do. | Tacconi, 95. |
| 16 | F. | do. do. | Morgagni, 94. |
| 20 | M. | do. do. | Case 11. |

| Age. | Sex. | Valves agglutinated. | Cases & authorities. |
|---|---|---|---|
| 22 | M. | Agglutin. of semilunar valves of pulmonary artery. | Thomson & Turner, 103. |
| 25 | M. | do. do. | Louis, 98. |
| 26 | M. | do. do. | Chelius, 99. |
| 27 | M. | do. do. | Law Nixon, 44. |
| 30 | F. | Agglutination of semilunar valves of aorta. | Bouillaud, 12. |
| 53 | F. | Agglutination of semilunar valve of aorta with the inner surface of the artery. | Kingston, 28. |
| 57 | F. | Agglutination of semilunar valves of pulmonary artery. | Lallemand and Bertin, 97. |
|  | F. | Agglutination of semilunar valves with the inner surface of the aorta. | Littre. |
|  | F. | Agglutination of semilunar valves of aorta. | Case 11. |
|  | M. | do. do. | Stokes. |
|  | F. | do. do. | Museum of College of Surgeons, Edin. |
|  | M. | Agglutination of semilunar valves of pulmonary artery. | Cruveilhier, 104. |

### V. *Growths on the semilunar valves and the inner surface of the arteries in consequence of inflammation.*

| Age. | Sex. |  | Cases & authorities. |
|---|---|---|---|
| 25–30 | M. | On the semilunar valves of aorta. | Bouillaud, 14. |
| 40 | M. | do. do. | Case, 4. |
| 43 | M. | do. do. | Fenema, 13. |
| 60 | M. | On the semilunar valves of aorta and inner surface of aorta. | Meckel, 33. |

Thus it appears that among 77 cases there are found 50 males and only 27 females; showing that the male sex are more frequently the subjects of inflammation of the arteries and their consequences than the female sex. The cause is manifestly to be sought in the circumstance, that men being devoted to a more laborious mode of life, and with greater corporeal efforts, are more frequently exposed to violent vicissitudes of heat and cold, and that they use more than women spirituous drinks, which irritate the vascular system.

Inflammation of arteries with its consequences is observed not unfrequently in infants at birth; and in such a process is founded the frequent congenital, narrowing and closure of the pulmonary artery, as well as the more rare narrowing and closure of the aorta. Meckel found in a monstrous fœtus, in which the brain presented a large sac filled with serum, and in which the arteries and veins were ramified, the left carotid artery inflamed, its inner surface reddened, and its walls thickened. Its canal was narrowed by clots of blood, which were attached to its inner surface. The vessels of the naval string, the arteries and veins are sometimes narrowed and obliterated, and of this Landsberger has communicated several examples. Such fœtuses are always much emaciated; the circulation is deranged; and they are still-born. The author found in a still-born child one of the umbilical arteries almost from the navel obliterated for the space of several lines, while the other umbilical artery and the umbilical vein were manifestly contracted.

*Arteritis* evinces different degrees of what may be called extensiveness. In rare cases it attacks all the arteries, and is at the same time associated with inflammation of the inner membrane of the heart and with inflammation of the veins. Cases like those given by Barde and Meli show the inflammatory disposition and action through the whole vascular system, which is an uncommon disease.

Often with arteritis is associated simple inflammation of the heart, viz. of its inner membrane, a genuine endocarditis. The inner membrane is then more or less reddened, swelled, thickened, detached, and covered with coagulable lymph, which often adheres closely; and such cases of exudation of coagulable lymph from the inner surface of the heart and attached to the *laciniæ* of the valves were observed by Baillie, Burns, Kreysig, Laennec, Bouillaud, Hope, and other observers. Endocarditis is often connected with inflammation of the aorta and pulmonary artery. And occasionally with arteritis is associated inflammation of the veins. The inner coat of these vessels is then of a bright red, thickened, softened, and covered with lymph; and sometimes the veins are agglutinated and closed. Thus in the case by Solon (60) in aneurism of the arch of the aorta, the innominata and the superior cava were obliterated. In gangrene of the lower extremities, often all the arteries of the limb are attacked, and the disease spreads into the iliac arteries and the abdominal aorta. Inflammation, narrowing, and closure of arteries is usually a partial action, confined to an individual spot, where the vessel has suffered pressure from an aneurismal sac, from enlarged and indurated glands, or from an organ which has become hypertrophied.

Among occasional causes of inflammation of the arterial system in its greatest extent, the author places youth and the middle period of life, especially among the plethoric, the strong and vigorous, who are mostly in the open air, undergo great corporeal efforts, live much on animal food, and are addicted to the use of spirituous liquors.

The abuse of spirituous liquors, strong wine and brandy must, he argues, lay the disposition to inflammation of the vascular system; because it is proved by experiments on living animals that alcohol passes into the blood, and excites the heart to more forcible and vigorous action, and quickens the motion of the blood. Alcohol mixed with the blood must also produce irritation of the internal coat of the arteries; and in several of the cases recorded it is expressly stated, that the patients had been much addicted to the use of spirituous liquors.

Of the general effect of the use of these irritating articles there can indeed be no doubt. In one point only do we think the professor's inferences are not consistent and not correct. The use of spirits either in the lower animals or in man does not quicken the motion of the blood. It retards that motion; and if the dose be large it stops the movement of the blood entirely. It certainly does rouse the heart to more frequent and more forcible contractions; but it does not from this follow that the movement of the blood is quickened. It will be invariably found that the contractions of the heart may be forcible and frequent, while the blood is moving more slowly than in the natural state. It is certain that the blood accumulates in the organs, and moving progressively more slowly, at length ceases to move altogether.

The most frequent occasional cause which produces inflammation of the vascular system in general, or of individual arteries, he considers to be sudden suppression of the cutaneous transpiration by violent chilling while the body is heated, and the motion of the blood quickened and forcible, from great muscular action, or the abuse of spirituous liquors, or both together. The blood, he adds, is repelled, by the operation of the cold on the skin, from the cutaneous vessels, and flows into the capillaries of the irritated walls of the arteries. The cutaneous transpiration may be suppressed by keen winter's cold, a draught of cold air, wetting with rain, the imprudent use of the cold bath, or cold bathing. These inferences he shows to be established by considering the circumstances of several of the cases recorded in the first part of the work, especially those by Thomson, Meli, Meckel and Hermann, Otto and Schlesinger. In some cases, even inflammation of the arteries of the lower extremities, and gangrene of the same has followed sudden suppression of the cutaneous transpiration in walking with bare feet over a cold stone pavement.

All these are doubtless exciting causes. But it must be observed that their influence would be null and inert, without a previous morbid state in the system, and in the arterial tunics of the individuals. In all the cases in which arteritis and mortification have appeared to ensue on exposure to cold, it has been found, if not known, that the arterial tunics were previously in a state of chronic inflammation, thickened, opaque, their internal coats covered by steatomatous and atheromatous deposit, and, in short, rigid and liable to undergo the acute form of the disease.

Occasional causes of inflammatory irritation of the inner coat of arteries may also be found in violent and long continued corporeal exertions, as rapid running, dancing, climbing mountains, rowing, lifting and drawing heavy loads, and excessive heating, by which the action of the heart and blood-vessels is accelerated and rendered more forcible. Tefta considers the long continued standing in the stooping attitude in field and garden labour, as in digging, working with the hoe, and similar implements, and the incurvated and tortuous position of the aorta thereby caused, as a prejudicial influence which might cause inflammation of the aorta. In most of the cases, certainly, the individuals had been subjected to laborious occupations in constrained positions; and in several to very violent and great corporeal efforts.

The whole of this representation of the etiology of this affection is, nevertheless, pervaded by a most serious and fundamental error. We have noticed formerly the mistake into which we conceive the learned professor has fallen in ascribing to inflammation those cases of arctation and closure of the aorta which we have shown there is the strongest reason to believe had taken place at a very early period of life. Now not only has the present author ascribed these cases to the effect of recent inflammation, but he has also ascribed that inflammatory attack to the exposure to cold, the violent corporeal effort, or, in short, the last event that took place previous to the appearance of that train of symptoms which terminated in death. It is hence that he represents cold applied to the feet, walking with bare feet over a cold stone pavement, the use of cold bathing, carrying a heavy load, lifting a great weight, and all similar accidents as causes of *arteritis*. It is quite possible that these circumstances may be exciting causes of *arteritis*. But in the cases recorded, and from which these inferences are drawn, these circumstances neither produced *arteritis* nor did *arteritis* exist. The arctation or closure of the artery already existed long previously; and the application of cold to the feet, or to any other part of the person, the corporeal effort in lifting a weight, or carrying a load acted merely in repelling all the blood of the system on a weak part, or throwing an unusual strain on that part, and thereby causing it to give way, and not in inducing any attack of *arteritis*. Had not this arctation or closure of the aorta previously existed, the exposure to cold, or even the great strain on the muscles, would have been as free from result as they are in strong and well-constituted persons in general. With such an organic change, however, with so great an impediment to the circulation, the system was not prepared to stand so great and so powerful a disturbing force, so violent a strain on the blood-vessels, and the natural and necessary result was either laceration of the parts, such as took place in several of the cases, or an acute attack of inflammatory reaction too violent for the parts to endure.

We must therefore say, that, in enumerating various causes of *arteritis*, and estimating their influence and operation, a correction of this error must be made, and, in short, the whole of these cases ought to be excluded from the category.

In short, we say explicitly that the circumstances assigned as causes by Professor Tiedemann, though doubtless of consequence, would not produce the effect alleged, unless where there is previous organic disease.

Inflammation of the inner arterial tissue, he adds, is often observed as an adjunct in ardent exanthematous diseases, with intense febrile disorder, viz. in measles, scarlet fever, and small-pox. Kreysig several times found in the bodies of children destroyed by measles or scarlet fever, the inner membrane of the heart and blood-vessels inflamed, especially when, at the eruption of the exanthema, tumultuous action of the heart and a very rapid and irritated pulse had taken place. This was observed in like manner by Otto. And Taunton noticed in many persons destroyed by small-pox the marks of inflammation in various stages and degrees in the arteries. The same phenomenon is observed in the arteries in repelled cutaneous eruptions.

That arteritis should take place in acute rheumatism and gout is not at all surprising. It has been long known that in the gouty both the inner membrane of the heart and that of the arteries is often affected with the marks of chronic inflammation; and endocarditis is common in acute rheumatism. The author refers to many facts recorded in the present work confirmatory of the same conclusion.

Other diseases tending to the same results are hooping-cough, syphilis, and the repeated or continued but unguarded use of mercurial medicines.

The author treats next of the causes of albuminous deposits, of earthy concretions, of atheromatous and purulent deposits in the walls of arteries.

He allows that on the subject of earthy concretions, commonly called ossifications, much obscurity prevails. Though these changes have been observed, and more or less fully noticed by many anatomists and pathologists from Fallopius to the present time, yet on their nature and essence, their mode of origin, and the causes from which they proceed, very contradictory views are entertained: and he thinks it not yet determined whether they are to be viewed as morbid products, or rather as the effects of advanced age.

The change may be confined to one or more arteries, or extended over several arteries at the same time. The aorta at its origin, with the semilunar valves, and the arch at its ascending or descending portions, are earliest and most frequently ossified. Next most frequent are the branches issuing from it, as the coronaries. The intercostals are less frequently ossified. The author never saw the œsophageal arteries ossified. The innominata and the common carotid he thinks alone are seldom ossified. Yet in the former Sandifort saw a large patch; and the latter the present author found ossified at the division into external and internal carotids.

In the pulmonary artery and its divisions earthy or bony deposits are rare. They have, nevertheless, been noticed by various authors; Chomel Senior, Bàader, Stoll, Corvisart, Lobstein, and Andral.

There seems to be no doubt that these deposits are a secretion between the inner and fibrous coats, from the inner surface of which they are probably formed. To this idea the presence of intermediate cellular tissue is not requisite, although Professor Tiedemann seems embarrassed by the fact, that there is no such intermediate cellular tissue. It is well known that these deposits present nothing like the normal osseous structure; no reticular arrangement, no canals, no diploe, no periosteum, no medulla, and no nutrient vessels. They are, in truth, essentially an earthy or calcareous deposit, very much like calcareous formations within the mucous surfaces. This view, which, he observes, was taken by Bichat, Hodgson, Cruveilhier, Lobstein, Craigie, Andral, Hope, Sebastian, and himself, has been confirmed by the subsequent microscopical observations of Miescher and Valentin, the former of whom never found in them the true elements of bone, but only an earthy matter without organic structure; while the latter denominated them organized calcareous deposits, because he found calcareous matter deposited in a very delicate organic layer.

So far pathological opinion is tolerably accordant. But we find very different views given by different authors on the first appearance, the mode of origin, the subsequent formation, and the changes undergone by earthy concretions in the arterial tunics. Vater, Budaeus, Schacher, Crell, and others allowed them to arise from a deposit or secretion of fluid earthy matter, which was secreted in the arterial tunics, from the blood overloaded with salts in advanced age; and they named this secretion and the solidification of the earthy matter lithiasis. Haller admitted at one time a yellow semifluid matter, which he believed to be effused from the small vessels of the arterial walls into the cellular tissue, between the internal and fibrous coat, and to be there progressively thickened and hardened; at another, he regarded the earthy plates to proceed from a coagulable osseous matter, which progressively became consistent, assumed an earthy or gristly state, and, lastly, a state like bony scales. Malacarne observed that the substance was at first reddish, pulpy, and vascular, and afterwards became whitish-gray and lacerable, then yellow and firm as leather, and, lastly, perfectly white and hard as chalk or bone.

Meckel states that under whatever shape the abnormal osseous matter appears, it presents essentially the same appearances as the normal bony texture. It always runs the same course which the formations of the usual bone indicate, and beginning with a gelatinous state, passes then to the cartilaginous, and finally into that of bony granules. He, however, admits that the completed bony secretion exhibits nothing like medulla or diploe, contains no vessels, and presents always a solid homogeneous substance.

On the origin and first appearance of earthy concretions in the arterial walls, the observations of Morgagni, Hodgson, Cruveilhier, Andral, Lobstein, Craigie, Hope, Bizot, and the author himself, have led to the following inferences. The patches are always preceded, as is particularly evident in the aorta and its large branches, by the formation of small whitish or pale yellow points, which are often scarcely the size of pin-heads. These gradually increase in size, coalesce with each other, and present then at the inner surface of the artery elevated whitish spots resembling drops of wax. In the aorta they are as large as lentiles, peas, and beans, and are disseminated over the walls of the vessel. These spots consist of a substance at first soft and fine grained, which is deposited at the outer surface of the inner smooth coat, and adheres to it. The inner tunic is easily detached from this substance, and it appears thickened and opaque, while that around the spots has its natural condition. Similar specks and deposits also always precede ossification of the valves of the heart.

These specks Valentin examined by the microscope, and he found the first traces of ossification in the thoracic aorta of a middle-aged man, like irregular white specks, which differ from the yellow layer of the artery by their white colour. When sections of the artery were placed in distilled water, the specks could easily, and without injury to the fibrous coat, be scraped off, that the fluid thereby presented a milky aspect. The deposits consist of a mass of round or roundish, not unfrequently irregular-shaped globules, which were white, had no nucleus, and might be compared to milk globules. By their heap-like mode of aggregation they formed the irregular specks, yet without any thing heterogeneous in their constitution. In water the granules were completely insoluble, and remained long suspended in it. On the contrary, they were easily dissolved in concentrated hydrochloric acid. When to the hydrochloric solution caustic ammonia was added in excess and afterwards oxalic acid, forthwith they showed the presence of lime by evident turbidity, and after thirty-six hours there was a precipitate of oxalate of lime. Chloride of barium showed feeble milky opacity, which eventually gave evidence of sulphuric acid in small quantity. After separation of all the lime, the addition of phosphate of soda gave no indication of the presence of any alkaline earths. From these experiments Valentin infers that the granules of the white specks consist of lime, a small quantity of sulphuric acid, and a peculiar albuminous organic matter.

The author believes, therefore, that these white specks, as the first beginnings of the earthy concretions of arteries, must be regarded as an albuminous deposition or exudation in the arterial walls.

Besides the deposition now mentioned, however, some authors, and among others Hodgson, believe in a peculiar thickening and induration of the inner coat of arteries, which is often connected with calcareous deposit. The inner coat of the aorta he several times found thickened, whitish, opaque, and hard, but never cartilaginous. Bizot, on the other hand, allows the existence of cartilaginous patches which he met in all the divisions of the aortic system.

As to the composition of the calcareous deposit itself the author gives the analysis of Lassaigne as one of the most complete. It is as follows,—

| | |
|---|---|
| Animal matter, | 50 |
| Phosphate of lime, | 47·5 |
| Carbonate of lime, | 2 |
| Sulphate of lime, | traces. |
| | 100 |

On the constitution of the arteries as to earthy matter his colleague Gmelin gave him the following facts. The arteries of a new-born child completely dried presented 1.5 per cent. of ash, which contained 0.86 per cent. of phosphate of lime. The healthy arteries of a man gave 2.808 per cent. of ash, which contained 1.25 per cent. of phosphate of lime. He also took from the body of an aged man a portion of sound artery (1), a portion with incipient ossification (2), and a portion with complete ossification (3). These examined in the same way gave the following results,—

| | No. 1. | No. 2. | No. 3. |
|---|---|---|---|
| Phosphate of lime, | 2·77 | 2·99 | 4·01 |
| Carbonate of lime, | 0·35 | 0·31 | 0·53 |

It thus appears that in complete ossification the quantity of phosphate of lime and of carbonate of lime was actually increased.

On the nature and origin of the atheromatous matter found between the earthy concretions and the fibrous coat of arteries, and on the morbid changes and consequences, which they cause in the arterial tunics, the opinions of anatomists and pathologists are much divided. Some regard them as a morbid product formed in the white specks of the arteries, which precede ossification, and suppose the earthy concretions to proceed from the atheromatous matter. Such is the view of Meckel and Andral. Sebastian considers the atheromatous matter similar to tubercular matter, and views it and the earthy deposit as the result of the tubercular *dyscrasia*; and this opinion he sustains on the fact, that they are often found in conjunction with tubercles in the lungs and other organs, as observed by Hodgson, Otto, Fleischmann, Solon, MacAdam, Nixon, and himself. But atheromatous matter, the author argues, cannot be held as identical with tubercular matter, because it always appears first when the white specks and earthy concretions are previously formed, and therefore is secondary to them.

Bizot regards the atheroma of the arteries as proceeding from softening of the albuminous deposit between the inner and fibrous coat. Hodgson, again, considers it as a puriform matter to which the softening and solution of the arterial walls gives rise, and thereby causes ulceration. A similar view, he adds, is not less decidedly taken by Dr Craigie, whose observations are cited in the following words. "The term atheromatous has been applied to a semifluid or cheesy opaque substance, which is not unfrequently found between the inner and proper tunics of arteries. Its consistence may vary from that of purulent matter to the tenacity of curd, or the granular firmness of cheese. Observed by the first Monro, by Haller, and others, it appears to be considered by Scarpa as a variety of the same change which I am afterwards to mention as steatomatous deposition. From this certain circumstances show that it ought to be distinguished. 1*st*, Atheromatous deposition appears to arise from a sort of suppuration; for, in general, it is possible to trace the transition from purulent fluid to the concrete matter of atheroma. 2*d*, This account of its origin derives strong confirmation from the fact, that it almost always contains a patch or patches of calcareous matter in its centre. 3*d*, It is associated much more frequently with the calcareous than with the steatomatous deposit. It is for these reasons not unlikely that the atheromatous deposition is to be viewed as one of the effects of chronic inflammation, either in the inner or the proper tunic, or in both."

With these views, he tells us, his observations continued for many years in general accord. Never has he observed atheromatous matter in the white specks or albuminous deposits before the formation of calcareous concretions or earthy scales. Constantly he saw them only near and around already formed earthy concretions. The formation of atheroma, therefore, he infers, must be viewed as a consequence and effect of already existing calcareous deposits. From the same facts it results, that it is a mistake to think that atheroma arises from softening of the white specks, or that the earthy patches are formed from the substance of atheroma.

At the spots where atheromatous matter has been formed around earthy concretions in arteries, the author always found the fibrous tunic softened, detached, or completely dissolved and destroyed, so that it was in contact with the inner layer of the cellular coat of the arteries. In general he saw the inner smooth arterial coat destroyed at the edges of the earthy scales, as if consumed or eroded. Hence the blood comes in contact with the earthy concretions, and is pressed into the cavity which contained the atheromatous matter. By the process of softening and solution which the atheromatous matter caused in the arterial tunics, the earthy concretions were constantly more detached from the arterial walls; and sometimes they were separated altogether, and projected into the canal, where they were carried away by the current of blood.

The atheromatous matter, in short, he concludes, in considering with Hodgson and Craigie as a sort of purulent matter, and the result of a genuine suppurating and ulcerating process; and in proof of the correctness of this inference he adduces various examples in which ulceration had been observed to have taken place in the arterial tunics from the presence of earthy and atheromatous matter. Ulcers indeed of this kind give the frequent disposition to the formation of partial or circumscribed aneurism.

In considering the causes which lead to the formation of earthy concretions, Professor Tiedemann is opposed to the idea that advanced age is entitled to this character. Lobstein indeed had remarked that the degree and the frequency of ossification bears not any proportion to the degree of advanced life; and the present author adduces various facts from Scheuchzer, Keil, Harvey, and Morgagni, to show that persons may attain a very advanced period of life, (92, 109, 130, 153, in the case of old Parr), yet without any trace of ossification in the blood-vessels. These observations are confirmed by Meckel, Otto, Andral and the present author. He therefore concludes that ossification of arteries is not a necessary condition of advanced age, and that when it takes place, it does not increase in the same proportion in which the individual advances in life.

It must follow, then, that the deposition of bone or calcareous matter in the arteries is a morbid product, a result, in short, of morbid action; and this opinion is pretty generally adopted by anatomists and pathologists. What are the circumstances favourable to its formation, however, is still a subject of controversy.

Many have believed that the main cause of these depositions is to be found in an excessive impregnation of the blood with earthy materials; an opinion which has been maintained by Langhans, Budaeus, Schacher, Crell, Haller, and others. It is supposed that, as by the diminished force of the heart in advanced age these materials are not expelled by the secreting organs, especially the kidneys, and separated from the blood, they must be deposited in the soft parts and in the arterial tunics. This view is espoused by Lobstein, who says that he thinks it not improbable that the superfluous phosphate of lime, when it is not expelled from the blood by the kidneys, is deposited in the arterial walls exactly as the uric acid is deposited in the joints and forms gouty concretions. It may be conjectured that very azotized nutriment implies the necessity of a copious excretion of uric acid and phosphate of lime from the blood by the urine, and that when the urine is no longer able to discharge these elements, they must be deposited in the joints and the arterial walls. This hypothesis, therefore, leads to the admission of a morbid state of the blood. But whatever be the cause of arterial ossification, its mechanism, the effect of abnormal nutrition is accomplished by a long-continued and imperceptible process.

Other pathologists, as Testa and Kreysig, regard the excessive impregnation of the blood with earthy matter as a mere disposing cause; while the proximate cause they consider to be inflammation, especially of a gouty character. Thus the last of these authors, while he says that the cause of earthy concretions and ossifications of the valves of the heart and of the arteries is to be sought in the constitution of the blood, which in advanced age abounds in earthy matter, yet adds, that gouty inflammation gives occasion to the exudation in the valves or within the arteries of a layer or small quantity of plastic lymph containing earthy matter. Parry regarded the cause of ossification to be an inflammatory process which, from a luxurious mode of life, appeared under the form of acute rheumatism.

Many recent pathologists, Spangenberg, Broussais and his followers, consider the morbid deposits in the arterial tunics uniformly as effects of a morbid irritation, and regard the white specks and earthy concretions as different metamorphoses of an effusion of lymph in consequence of acute or chronic inflammation. To the same views also is Bouillaud inclined, regarding all thickening and earthy deposition in the valves of the heart as the result of chronic *endocarditis*.

After some examination of the opinions of those who have opposed the idea that ossification is a result of inflammation, we proceed to notice the conclusions at which the author himself arrives. He holds the whitish specks and eminences on the inner coat of arteries, which constantly precede the formation of earthy concretions or bony patches, in whatever period of life they may take place, as albuminous exudations, and products of a morbid irritative condition of the arterial walls. This consists in inflammation mostly of the slow or chronic character, but sometimes also in acute inflammation; and then follows simultaneously with the inflammation an effusion of plastic lymph from the inner coat of the arteries. On the other hand, he regards the deposits of calcareous scales in the albuminous exudation which ensues at a much later period, as no more than an effect of an irritative state and an inflammatory process. It takes place according to a law observed in all the organs and textures of the human body, that in parts and formations, as well as in old inflammatory exudations, when they lose their vital properties and living characters, calcareous matter is secreted from the blood in these textures, which as it were become calcarized or penetrated with earthy matter. In this way these parts are gradually converted into earthy and stony matter, which are erroneously considered to be true bone. But from these they differ, as has been formerly shown, both in mode of origin and formation, and in texture, and have with the same nothing in common except the penetration with earthy matter, by which an apparent similitude to bony matter is produced.

This inflammation, he allows, is very often of rheumatic or gouty character, and most usually takes place in those who live freely on animal food, take much wine or other strong liquors, and otherwise live intemperately and luxuriously.

He then gives an elaborate and ample view of the instances of ossification or earthy concretions found, or said to be observed in the different textures and organs of the human body. These, he maintains, are not examples of genuine ossification, but merely of the calcareous or earthy deposit taking place in textures more or less diseased, and which ought to be named false ossification.

These we can only enumerate. They are the placenta, the fœtus, the different serous membranes, the cellular membrane, the heart, the veins, the absorbent vessels, and glands, the secreting glands, as the kidney, liver, female mamma, the lungs, the brain, and nerves, the pupil of the eye, the crystalline lens, and the organs of reproduction in both sexes.

This completes the first section of the second division of the work.

The second section, which is entitled on the consequences and effects of Narrowing and Closure of the Arteries, is devoted to the examination of the symptoms and signs by which the various causes of this accident, and also the accident itself are attended, and to elucidation of the effects which are thus produced either in the rest of the arterial system, or in the system at large. The section is subdivided into seven chapters.

In the first of these the author gives a view of the symptoms of arteritis or arterial inflammation deduced from the cases detailed.

He informs us that acute arteritis is particularly distinguished by great irritation in the vascular system. The heart beats violently, rapidly, and tumultuously; its actions are manifest and audible; and are at the same time represented by the patient as very distressing. The pulse is accelerated; and all the superficial arteries, the carotids, the facial, and the radial throb violently, and present a sort of vibratory beating. The pulse is very hard and tense. In the course of the arteries the patients feel great heat, and more or less intense pain, aggravated by touch.

The phenomena now mentioned in the vascular system are consequences and effects of inflammation of the arteries. In cases of more violent and more extensive arteritis, the pulse presents the symptom called the double beat, (*p. dicrotus.*)

With accelerated motion of the blood, quick breathing often takes place. If the arteritis is intense and extensive, the respiration is confined, in consequence of the blood accumulating through the left side of the heart and the arteries in the vessels of the lungs.

Patients suffering under inflammation of the arteries feel an internal burning heat; and he favours the conjecture of Joseph Frank, that the Causus or burning fever of the ancients was probably an arterial inflammation. The patients are restless, and toss about the bed unable to continue in one position. They are sleepless, or the sleep is disturbed by bad dreams. All the secretions are suppressed; the skin is dry, burning hot, the countenance flushed. The mucous membrane of the mouth, tongue, and throat is hot; and the individuals suffer an unquenchable thirst,—longing for cooling and acid liquors. The urine is scanty, high red and without precipitate.

When the calibre of the arteries in the progress of the disease is gradually narrowed by effusion of lymph, and the contraction of the fibrous coat, and the arteries in the interior begin to enlarge, the pulse below the inflamed spots is irregular, small, feeble, often scarcely perceptible. In large arteries, as the carotid and subclavian, a bellow's sound murmur has sometimes been heard below the inflamed spots, which arose from the blood being urged with greater force. Lastly, the pulse fails altogether in the closed spots, and the obliterated artery feels like a hard chord.

With the obliteration of the arteries the warmth of the members diminishes, and they show a great tendency to become cold. Then sensibility is diminished, and there follows the sense of their being asleep. In general patients are no longer able to move the limbs voluntarily. Serum is accumulated in the cellular tissue, causing œdema; afterwards gangrene may follow.

When several large arteries are closed, and the blood thereby is moved with difficulty, blood accumulates in the internal organs, and hemorrhages take place.

Debility increases; and very commonly the patient expires suddenly.

The second chapter is devoted to the subject of the symptoms which attend inflammation, narrowing, and closure of the aorta. Here, however, we find the author adheres, consistently enough no doubt, to his idea, that all the cases of obliterated or contracted aorta which he has recorded, originated in previous inflammation, not very long before. This idea, which we have already said we regard as erroneous, has the effect of rendering the whole of his notions and descriptions on this subject erroneous; and we do not think, therefore, that we can with any propriety give his view of the symptoms as a correct and just delineation. The whole subject would indeed require to be reconsidered and examined with the most scrupulous attention to the facts now stated.

In the third chapter the author treats of the commencement of the collateral circulation in arctation and closure of the arteries. The most remarkable and important phenomenon, so far as relates to the knowledge of the circulation in the morbid state, is undeniably the dilatation of the lateral branches proceeding from the narrowed or closed trunk, and their anastomoses with branches and twigs which take their origin below the narrowed or closed spot. It takes place in a far higher degree than has been observed after the application of a ligature to an artery. In this way the blood finds through the enlarging collateral vessels, and their anastomosing connections, a passage to the parts of which the artery is narrowed or altogether closed, and they are nourished and retain their vital properties. He then specifies the ways and channels by which the circulation is maintained and preserved, in narrowing and closure of different arteries in the cases already recorded.

Of this a great part has been already considered more or less fully by anticipation, in recording the cases given in the first division of the work; and, as much repetition is to be avoided, we shall advert only to a few of the most important points.

When the aorta is narrowed or closed immediately below the arch in the beginning of the thoracic part, and the circulation by the proper course to the lower half of the body is impeded or prevented, it is maintained, nevertheless, rather contrary to what seems credible, by the two subclavians and their branches. The numerous, and in the normal state very small and narrow anastomotic connections of these arteries with branches and twigs of the aorta below the narrowed or closed point, and with branches of the external iliacs are unusually enlarged, and furnish passages by which the blood easily reaches the parts lying below the diaphragm.

The anastomosing connections are as follow,—

1. The superior intercostal arteries of the subclavian, and their numerous small anastomoses with the superior intercostals of the aorta.

2. The *transversales colli* and their anastomotic connections with the posterior or spinal branches of the aortic intercostals.

3. The internal mammary or thoracic arteries and their many anastomoses with the anterior or external branches of the aortic intercostals; their connections with the anterior branches of the lumbar arteries in the abdominal parietes, and lastly, their multiplied connections with the deep epigastric branches of the external iliac arteries, by which blood is poured into the latter.

In closure of the abdominal part of the aorta below the origin of the lower mesenteric artery and the common iliac arteries, the principal means by which the circulation is maintained are the internal mammary arteries and their anastomotic communications with the inferior epigastric arteries, which then are much enlarged; the lumbar arteries, especially the inferior, and their communications with the circumflex iliac arteries; and the internal spermatic vessels.

The observations adduced also sufficiently prove that large arterial trunks, even the aorta itself, beyond the arch, may be completely closed, without thereby the circulation of the blood being interrupted. In this way it may be understood how the life of the patient, in closure of the large vessels, and especially of the aorta, may be prolonged sometimes for years.

Along with the enlargement of the mere collateral vessels, it is also found that the capillary vessels undergo dilatation; and this seems to be necessary to the proper nutrition of the parts.

Another change in these vessels is the serpentine tortuous course which they assume. These vessels form frequent curvatures and windings, and sometimes multiplied networks of communicating vessels, forming, as Professor Tiedemann observes, a species of *retia mirabilia.*

The walls of the enlarged vessels become thicker and stronger than in the natural state.

In chapter fourth the author treats of gangrene as a consequence of closure of the arteries.

Parts of the human body may in many circumstances be deprived of their organization and die. The condition of death of one part, while the greater part of the body is still alive, has been named mortification, gangrene, or sphacelus, and has been distinguished into hot and cold gangrene. Gangrene ensues as a termination of violent inflammation, when, from forcible determination of blood, obstruction in the capillary vessels takes place, followed by laceration of the same and effusion of blood into the substance of organs. The inflammatory redness assumes then a purple, bluish, or dark tint. The swelling is increased, and in general there is uniform and extensive tension of the skin of the whole limb affected, and on parts covered with skin, there arise vesications from effusion of serum under the cuticle. The inflammatory heat and pain speedily diminish; the parts become cold, and are progressively deprived of their sensibility and mobility. With the cessation of circulation nutrition of the parts ceases. The blood and parenchyma of organs pass sooner or later into decomposition. The blood is dark coloured, the blood globules disappear, and the blood is dissolved into serum. The textures are softened, assume a dark-blue or violet colour, and are dissolved into a fetid offensive mass.

Gangrene, further, is known to take place as the effect of great mechanical violence, as after a blow, contusions, compound fractures, compound luxations, and similar injuries in which the organization of parts is destroyed; from the operation of chemical agents, as the concentrated acids or alkalies, which injure the textures; great extremes of heat and cold; the action of fire and lightening; the bites of poisonous serpents, vipers, the rattlesnake, and the hooded snake; and from the application of the morbid poisons, as pestilential poisons, the matter of carbuncle, and hospital gangrene. Impaired nervous influence, after ligature, or complete division of nerves, or injuries of the spinal marrow, may also cause gangrene. And lastly, gangrene may take place when the afflux of blood to parts by the arteries or the return by the veins is entirely impeded, and the parts, from the interrupted circulation through the same, are no longer adequately nourished. The latter is the form of the affection which here claims attention.

Mere division or ligature of the arterial trunk of a limb is rarely followed by gangrene, provided the lateral vessels issuing from the trunk above the interrupted point are enlarged, and by their anastomosis with branches below the interruption or ligature convey to the limb sufficient blood for its nourishment. But if the collateral circulation is interrupted, gangrene follows. Van Swieten mentions a case of division of the axillary artery by a knife, in which the artery was tied, and the wound indeed was healed; but the arm shrunk and dried like mummy. Astley Cooper saw after a stab by a knife in the inguinal region, which had injured the femoral artery, and for which a ligature was applied, gangrene follow. The author saw in the Guy's Hospital Collection the preparation of a thigh which had been attacked by gangrene, after a musket ball had lacerated the femoral artery.

Gangrene not unfrequently follows the application of a ligature to the arterial trunk in the operation for aneurism, because the aneurismal sac from pressure on the collateral branches has caused their closure. It may also be caused, we have reason to believe, when the ligature is applied to a large trunk, at a period before the collateral vessels have had time to enlarge; or when, in wound or injury of an artery, the ligature requires to be immediately applied in the same circumstances.

Gangrene may further take place, when swellings of different kinds compress an arterial trunk, and impede the motion of the blood.

The most frequent occasion of mortification arises from earthy concretions or ossifications deposited in the arterial walls, when they narrow or close the trunk and lateral branches of a limb, and thus obstruct or entirely interrupt the flow of blood through the canal. To this aged persons are particularly subject, and those who, through manifold excesses, have induced the evils of premature old age, as drinkers, epicures, and those of libidinous habits.

In males, like the deposit of earthy matter itself in the arterial walls, it is much more frequently met with than in females. It usually attacks the toes, and from them spreads over the feet to the legs; sometimes it appears on the fingers, and extends to the hand and fore-arm. The gangrene begins with a dark-red colour of the skin of one or more toes or fingers, mostly without swelling. These become cold, insensible, and the skin is sometimes livid, brown, or black as coal. The epidermis begins to be detached; and the corion appears dry, hard, horny, and shrivelled like a mummy, in general diffusing a peculiar offensively smelling exhalation.

The earliest observations of *gangræna senilis* are found in the writings of Beniveni and Smetius. Fabricius Hildanus treats on it expressly, under the name of *gangræna ex intemperie siccâ*. He was aware of the influence of impeded motion of the blood through the arteries and veins as a cause of the affection; and he adduces two cases, one an aged female, in whom gangrene attacked the fingers and spread to the hands; and the other, a man of 76, who had long suffered from gout, and in whom gangrene affected the toes. Dry gangrene was observed in the foot by Cobeliau, and by Barbette and others. Morgagni mentions it as a rare affection in Italy, and cites two cases, one in the foot in a man of 42, and the other in a man of 84 years. This sort of gangrene, mentioned sometimes as dry gangrene, sometimes as gangrene of the age, has been also treated by Coschwitz, O'Halloran, Le Dran, Kirkland, Jeannoy, and especially by Pott.

The first observations on the occurrence of earthy concretions or ossification in the arteries of the lower extremities and gangrene of the toes, are given by Cowper and Naish, who attributed the gangrene to the ossified state of the arterial canals, and the closure thereby induced. This idea has been adopted by a great number of subsequent pathologists, because, upon the whole, it has been found confirmed by observation and inspection of the arteries after death. Carsewell especially found in all cases of *gangræna senilis* which he observed, the arteries of the limb obliterated to so great a degree, that the circulation must thereby have been obstructed. The obstructing cause consisted in from five to six cases in a fibrous web in the walls or the canals of the artery by which they were changed into solid ligamentous chords. This condition proceeded from the toes, and extended upwards to the middle of the tibia, and was always connected with ossification of the branches and trunks of the femoral artery, and often of other arteries.

The general correctness of these conclusions has been confirmed by Brodie, Schott of Frankfort, Sir A. Cooper, and others. But after all, this state of the arteries seems to act in general as a predisposing cause only. It is commonly observed that the first exciting cause is some slight accident or injury, something so trifling that it causes no evil or inconvenience in a healthy person. But in those with this morbid state of the arteries it gives rise to great inflammation, of a bad and rapidly advancing character, and terminating speedily in a gangrene. Thus the pressure of a tight shoe, a blow on the foot, excessive cold inducing the individual to expose his feet, suddenly perhaps, to intense heat, cutting a corn or bunion, paring the nails even, have all been followed in persons with this state of the circulation and arteries, by gangrene of the toes and feet.

It is curious to remark in medical and pathological doctrines the tendency to innovate, to reject established opinions and principles, because they are established, not always because they are erroneous, and reinstate in their place new doctrines, not always because they are correct, but because they differ from those previously in use. The idea of gangrene depending on obstruction to the channel of the arteries and interruption to the movement of the blood was old and generally received. But this was only a reason for calling in question its accuracy; and accordingly some paradoxical but original innovators, as Haller and John Hunter, and perhaps one or two more, promulgated the opinion that, instead of the obstruction to the circulation being the cause of the gangrene, the gangrene caused the stoppage in the circulation. In point of fact, not only were arteries going to gangrenous parts, but veins coming from them, found obstructed and filled with bloody clots. A notion quite similar, if not the same, was supported by Sir Astley Cooper, who says in his brief and somewhat decided and summary way, "The nature of gangrene, as far as dissection enables me to judge of it, is this; the excessive action of the part kills the blood-vessels, and the blood contained in dead vessels becomes coagulated."

The whole of this difference originates, we say it with great respect for the memory of departed genius, in confusion of ideas, in confounding as identical two things quite different, and in not forming proper distinctions in the different cases. Both parties are right and both parties are wrong,—right in stating the relative connection of the two facts of gangrene and stoppage of circulation in two different sorts of gangrene, wrong in supposing that these two forms of gangrene are the same. The kind of gangrene to which the observations of Haller, John Hunter, and Sir A. Cooper apply, is that taking place in persons of all ages, the young and the old, in consequence of compound fractures and luxations, contusions, lacerations, burns, poisoned wounds, and morbid poisons in general, and perhaps we may add the application of the concentrated mineral acids. In such circumstances, gangrenous inflammation certainly kills the vessels, and the blood is found in them coagulated; or rather these vessels, not large trunks but small vessels, are unable to continue the circulation, and the result is stoppage and coagulation. This, however, is a very different sort of gangrene from that which takes place in connection with arterial trunks or branches previously diseased. It is moist or humid, or acute gangrene, and runs its course in general in three or four days; whereas the gangrenous affection which arises in connection with diseased, ossified, and obstructed arteries, is in general, or at least may be, a more chronic affection, and advances much more slowly and with much less certainty to the fatal termination. Instances of gangrene in connection with diseased arteries we have seen proceed for three weeks, four weeks, six weeks before death took place, and in several instances the patients have made temporary recoveries. Nothing of this is ever observed in the dry gangrene which attacks the feet of the aged, or those in whom the arterial system is ossified and the circulation languid and obstructed.

This heretical notion the present author summarily and decidedly controverts. "The above opinions," says he, "are erroneous. The blood coagulates not in consequence of gangrene; but gangrene takes place, because the motion of the blood is impeded; with this is connected coagulation of the blood which has ceased to move; and this extends further into the vessels, in proportion as the motion of the blood is impeded, and ceases even in the collateral vessels." These remarks, we conceive, are applicable principally, we would say solely, to the true dry gangrene, the spontaneous gangrene, as it may be named, which arises independent of compound fracture, compound luxation, contusion, laceration, burns or other similar violence, to that which is connected with previous chronic disease of the arteries, and not to the acute traumatic gangrene which attacks a limb after any one of the injuries now specified.

The author then considers another question which has caused some discussion on this subject. It is known that Dupuytren some years ago brought forward in his Leçons Orales the idea that gangrene of the toes and feet is often caused by acute inflammation of the arteries of the limb *(arteritis.)* This view was adopted or favoured by Broussais, Andry, François, Roche and Sanson, and some more adherents of the same school. The present author while he admits that *arteritis* may be a cause of *gangræna senilis*, maintains that it is an error to suppose that it is the most frequent cause. The most strenuous opponent of this opinion is Dr Carsewell, who contends, we think with some justice, that it is impossible for any one who has investigated anatomically the state of the arteries in *gangræna senilis* to believe that this affection depends on *arteritis*. Dr Carsewell indeed goes so far as to say that we have no evidence of idiopathic inflammation of the large arteries giving rise to mortification; and this perhaps may be the case. The present author, on the other hand, contends, that though the observation of Dr Carswell is well founded, the assertion is erroneous, that inflammation of arteries never causes gangrene, and that there are no cases to show that gangrene is the result of idiopathic inflammation of the arteries. Brodie, indeed, he says, denies that *arteritis* is a cause of gangrene in the aged; yet he allows the occurrence of one sort of gangrene, which appears along with *arteritis*, but which is rare, and may take place at any period of life.

He then takes a view of various cases given in the first part of the work, the second of his own series, Rostan's, Cruveilhier's, Roux's, Velpeau's, Maisonneuve's, to substantiate the correctness of the inference. Here we think he fails. In all these cases there was evidence of previous disease of the arteries,—rigidity, steatomatous and earthy deposit. The arteries were previously in a state of chronic inflammation with disorganization of their coats. The case given by Sir Benjamin Brodie in his lectures, (84 of the present work,) is the only one which can with any semblance of justice be referred to this head. In short, we think that this is, as before, a dispute arising from confusion and want of distinct ideas on the subject. Two things very distinct are confounded; and the result is great error and misunderstanding. To inflammation, and especially acute inflammation, it appears to us that the professor attaches a degree of importance to which it is not entitled. It is very often the effect of a previous state of disease; and it seems to be itself an attempt to counteract the hurtful effects of that previous state of disease.

The author maintains, nevertheless, that the observations enumerated in this chapter sufficiently prove the occurrence of a species of dry gangrene, from acute inflammation of the arteries with exudation of coagulable lymph within their canal. If, says he, by this the trunk, all the collateral branches and the anastomosing twigs, and capillary vessels of a member are so much closed that the motion of the blood in the arteries is entirely interrupted, nutrition ceases, and the limb dies and becomes gangrenous. But this sort of gangrene ought not to be called *gangræna senilis*, because it may happen at any period of life, under circumstances already referred to, which may induce acute arterial inflammation. This affection has been observed in children, young persons, and adults of both sexes. It happens also, though rarely, in the aged. In order to substantiate this statement, he gives the ages in a series of cases in which gangrene took place in connection with *arteritis*, without any earthy deposit having been found in the walls of the arteries.

| | Ages. | | Gangrenous parts. | Authorities. |
|---|---|---|---|---|
| 1 | 3 yrs. | Child. | Left leg. | Nicod. |
| 2 | 3¼ | Child. | Arm and | Solly. |
| 3 | 3½ | Boy. | Left leg. | Baffos. |
| 4 | 12 | Girl. | Foot. | Dupuytren. |
| 5 | 13 | Boy. | Right foot and leg. | Brulatour. |
| 6 | 18 | Young man. | Finger and hand. | B. Cooper. |
| 7 | 18 | Female. | Right foot. | Greene. |
| 8 | 19 | Young man. | Foot. | Rousset. |
| 9 | 20 | Female. | Right hand and forearm. | Roux. |
| 10 | 20 | Male. | Lower extremities. | Pereira a Sousa. |
| 11 | 20 | | | |
| 12 | 22 | Female. | | Crisp. |
| 13 | 27 | Female. | Right foot and leg. | Brulatour. |
| 14 | 32 | Male. | | |
| 15 | 36 | Female. | Left foot. | Velpeau. |
| 16 | 38 | | Toes and foot. | M'Cready. |
| 17 | 50 | Negress. | Right arm. | Segond. |
| 18 | 52 | Female. | Left lower extremity. | Liegard. |
| 19 | 54 | Male. | Right lower extremity. | Buinet. |
| 20 | 56 | | Left hand and forearm. | Heermann. |
| 21 | 58 | Female. | Right foot. | Cruveilhier. |
| 22 | 66 | Male. | Left foot. | Legroux. |
| 23 | 67 | | Left hand and forearm. | Cruveilhier. |
| 24 | 74 | Female. | Left arm. | Rostan. |
| 25 | 81 | | Toes. | Cruveilhier. |

Though the parts affected with gangrene in consequence of acute inflammation of the arteries undergo the same changes as in senile gangrene, that is, become blue-red and black, shrunk and dried like mummy, yet, he argues, this gangrene is attended with other symptoms, and thereby is to be distinguished from it. It is always preceded by symptoms of acute *arteritis*, more or less violent febrile action, increased heat of skin, very quick, full, hard, and tense pulse. The violent burning or pungent pains in the course of the inflamed arteries, and which are aggravated by the slightest touch or pressure, are very characteristic.

A limb, which is gangrenous in *arteritis* from interrupted circulation through its vessels, differs essentially from one which has become paralytic from interrupted nervous influence. In the former there is a much higher degree of cold, with livid and black coloration of the skin; the pulse is gone; and the arteries feel like solid chords, but are painful on pressure; and in the gangrenous parts sensibility and mobility are utterly destroyed.

Gangrene taking place in *arteritis* differs further from gangrene occurring in consequence of interrupted circulation through the veins, whether from inflammation and agglutination of the same, or from the pressure of swellings on the veins. In the latter there is always considerable accumulation of blood in the branches, twigs, and divisions of the veins, which are dilated to a high degree. The skin is blue-red and much swelled. In the cellular tissue of the affected limb serum is effused, rendering it œdematous. On the skin are formed large vesications, in consequence of effusion of serum beneath the cuticle. Lastly, the parts become gangrenous, do not dry and shrink like mummy, do not become hard, but pass into real putrefaction or moist gangrene, dissolving in a very offensive smelling mass. In gangrene from closure of arteries with inflammation, on the contrary, there is death with dryness of the parts, because the afflux of fluids is prevented.

Dry gangrene, in consequence of acute *arteritis*, lastly, pursues a rapid course, makes speedy progress, mostly with symptoms of typhous fever, and kills sometimes in a few days, while *gangræna senilis* runs a chronic course.

After some observations on treatment and remedies, which may be passed over as containing nothing new, the author adverts to the process of healing, or stoppage rather and reparation, a process as wonderful as it is unfrequent. The phenomena are as follow, whether it be true *gangræna senilis*, or gangrene from acute *arteritis*. The gangrenous action ceases to spread; and at the limits between the dead and living parts appears on the skin a red line, at which begins the process of ulceration, by means of which the dead parts are separated from the living. Above the line the cuticle is elevated; and below it serum is effused. After some days there is seen below the separating cuticle a groove or furrow with purulent matter, and at this spot proceeds gradually the separation of the living from the dead parts by absorption and suppuration. The *cutis vera* becomes progressively thinner and is separated, and the subcutaneous cellular tissue is dissolved. Then is destroyed the connection between the muscles, afterwards that between the tendons, the obliterated vessels, and the nerves. On the suppurating surface of the living parts are formed granulations, and cicatrization follows.

This view, we think, is much more commonly applicable to the gangrene from *arteritis* than the gangrene of the aged. In the latter the disease usually proceeds steadily to the fatal termination. There are instances, indeed, in which it stops spontaneously apparently; or does not proceed rapidly and stops for a time. But in the great majority of cases, after it has once established itself, it proceeds steadily to the fatal result.

The author, nevertheless, lays it down as an established fact that gangrenous parts have been observed thus to be separated and detached not only in the young but in strong persons far advanced in age. The few cases, however, that he mentions of this kind occurred in young persons, except one, in which he says Chelius saw in a female of 82 years the separation of a gangrenous hand take place in the middle of the forearm.

He very properly pronounces amputation to be useless in both cases; and particularly so in that which takes place from arteritis.

This chapter is concluded with a short but learned and interesting sketch of the gangrenous disease resulting from the use of spurred rye (*Mal des Ardens*, *Necrosis*, Sauvages, *Ustilago*, die Kriebel Krankheit.) This we give in the Medical Intelligence, in which we think it is more properly placed.

In the fifth chapter are considered the disturbances in the animal economy, which arise in narrowing of the aortic orifice, and the symptoms therewith connected.

Arctation or narrowing of the orifice of the aorta takes place either from defects and inadequacy of the valves, or from morbid changes in their membranes at the origin from the left ventricle. The first are more common than the second. Diseases in the semilunar valves consist in agglutination of the same, and coalescence or *symphysis* of their edges in consequence of adhesive inflammation. The agglutinated valves form a sort of partition with a narrow opening in the centre.

More frequent are soft or hard growths, varying in size and shape at the edges or surfaces of the semilunar valves, which contract the aortie orifice.

Most frequent, however, are albuminous exudations of as hard as cartilage, or earthy concretions, generally single, irregular, and prominent, which being deposited in the valves, change the orifice of the aorta into a slit or chink more or less narrow, and render the valves stiff and very immovable. Of this multiplied examples have been observed and recorded. To consider as a normal state of old age, the deposition of earthy matter or ossification of the valves, to which the aged are so often subject, which many physicians do, is a mistake.

As to the arctation of the aortic orifice from morbid changes in the tunics of the aorta at its origin, this is in rare cases caused by a circular contraction, chording, or shrivelling of their fibrous tissue, as if it had been drawn together by the application of a ligature. There is formed only a very narrow round opening, as in the seventh case detailed in the first part, p. 119 and 120 of this volume, and as the author saw in three hearts in the collection of the College of Surgeons in Dublin. This change he represents to be the result of acute inflammation of the aorta, as in other instances of chording contraction, and then the semilunar valves are at the same time shrivelled and agglutinated. But the orifice of the aorta may also be contracted from deposit of albuminous exudation and earthy matter in its walls at its origin, as was observed by Harvey, Bartholin, Morgagni, Cheselden, Kreysig, and Hope.

Arctation of the orifice of the aorta, which uniformly, though varying according to the several degrees of contraction, causes an impediment to the issue of the blood from the left ventricle, produces many morbid symptoms. These concern first the motions and the structure of the heart itself; then they consist in derangement of the entire circulation; and thereby subvert all the functions of the human body. He adverts first to the morbid symptoms presented by the heart.

In contraction of the orifice of the aorta the left ventricle cannot properly empty itself of blood; and a quantity always remains behind which causes gradual enlargement of the ventricle; while the accumulated blood, exciting the ventricle to more frequent and violent contractions, renders the motion of the heart tumultuous and irregular. The walls of the ventricle also become thicker and stronger, in short, hypertrophied. The motions of the heart are more frequent and more forcible. Symptoms of violent and tumultuous palpitation take place. As the enlarged ventricle has a greater circumference than natural and hypertrophied walls, the beats of the organ are felt in a larger extent and with greater force than usual both by the hand and also by the ear. The beat of the heart extends sometimes to the seventh or eighth rib, sometimes more to the left and posteriorly than natural.

In simple contraction of the aorta there is felt on applying the hand, the author says, a vibratory motion like the purring of the cat, the *fremissement cataire* of the French, and on auscultation the bellows, saw, file, or rasp murmur. This observed over the middle of the sternum indicates the impediment presented to the blood in passing through the orifice of the aorta, or the friction of the blood on the inside of the aorta. The variety of murmur depends on the nature and seat of the obstructing and resisting cause. When on the valves there are soft growths, the bellows' murmur is dull. When there are solid bodies on the semilunar valves and these are stiff, rough, irregular, and elevated, the murmur is rough and grating, and resembling the sound produced by the saw, file, or rasp. In great contraction of the aortic orifice, where there is merely a small round aperture, whether from agglutination of the valves or constriction of the aorta, the bellows' sound is clear, sharp, whistling, or hissing.

Not uncommonly there are combined with contraction of the aortic orifice morbid changes in the mitral valve, by which the left auriculo-ventricular opening is more or less narrowed, and is converted into a narrow round orifice or into a narrow slit. The tips of the valve may be either occupied with soft reddish excrescences, or the valve may be thickened and penetrated with hard gritty deposit. In this case the second sound of the heart, which occurs during the diastole of the ventricles, and in the course of the blood from the auricle to the ventricle, is changed. Instead of being short and clear, it consists in a more or less prolonged bellows' sound. When the mitral valve is indurated, the saw, file, or rasping murmur is heard. When the orifice is greatly contracted, a hissing or whistling sound is sometimes heard.

These sounds are heard lower down than the first or systolic sounds, and indeed in the region of the mitral valve over the spot where the beat of the heart is observed. When the mitral valve is so stiff and immovable that it cannot close the orifice of the left ventricle in the systole, the blood regurgitates into the left auricle, and this regurgitation is accompanied with an after sound, which is simultaneous with that of the semilunar valves, and is similar to a grating vibration. When the left auricle is much dilated by accumulated blood, and its walls thickened, there are observed sometimes feeble motions in the mammary region to the left and behind, where lies the left auricle, which resemble those of the systole and diastole of the left ventricle.

From the impeded motion of the blood through the left side of the heart, in consequence of contraction of the orifice of the aorta, the blood is accumulated in the veins and arteries of the lungs, which are distended. This distension extends to the cavities of the right side, and renders their walls hypertrophied. This distension or dilatation and hypertrophy are often so extreme that the right side of the heart appears to cover and conceal the whole of the left cavities.

The subsequent account of the effects on the organs of respiration, and on the system at large, is correctly given; but it contains nothing new.

Contraction of the orifice of the pulmonary artery is a less frequent morbid state than that of the aorta. Yet the cases recorded in the present work show that it is occasionally met with. It takes places chiefly in consequence of adhesive inflammation of the inner membrane of the pulmonary artery, which is often attended with inflammation of the heart and endocarditis or with pericarditis. By this the circular edges of the semilunar valves are agglutinated to each other, are more or less united, and present a sort of partition, in which is placed a narrow aperture for the transition of the blood. The valves are at the same time thickened, and their sinuses are obliterated.

At the same time with arctation of the pulmonary artery there is united sometimes unusual contraction of the right auriculo-ventricular opening, in consequence of thickening and shrivelling of the tricuspid valve.

Of these changes, the effects are impeded motion of the blood from the right ventricle, which is accumulated in that ventricle and greatly distends its cavity, and causes enlargement of the circumference of the heart, enlargement and dilatation of the right auricle and of the whole venous system connected with the right side of the heart, and very often, nay almost always, blueness of the surface.

The most important circumstance in connection with this arctation of the orifice of the pulmonary artery is the patent or open state of the *foramen ovale* and the inter-auricular septum. From this Morgagni inferred that the arctation of the pulmonary artery had taken place at birth. But the author argues that this could not be the case, otherwise the *ductus arteriosus* must have been open also, which it is not. He thinks it much more probable that this aperture had been reopened by the difficulty which the blood encountered in moving from the right side of the heart, and, indeed, because from the great over-distension of the right auricle with blood, the valve of the *foramen ovale* is destroyed, or the thin partition in the *fossa ovalis* itself is lacerated.

The breathing is short, rapid, much oppressed, difficult, and panting; and symptoms of breathlessness and suffocation take place, especially in walking and ascending stairs, or even on the slightest muscular exertion. This depends on the pulmonary vessels being empty of blood, or deficient oxygenation of the blood, whence arises the sensation of want of air, and the necessity of oxygen, in short, a true need of respiration, because too small a quantity of arterial blood is conveyed into the large or general circulation.

In all the cases recorded except two, the aorta or left ventricle was smaller in capacity, and its walls were thinner than the right or pulmonary ventricle. But the cause of this exception, which was observed in the cases of Lallemand and Bertin, does not appear from the dissection.

The pulse is very quick, small, feeble, and easily compressible, —a result of the small quantity of blood sent into the general circulation, and the atrophied state of the left ventricle.

Very commonly the liver and spleen are more or less enlarged and turgid with dark-coloured blood, also a consequence of the unusual congestion of the venous system.

As the disease advances the breathing becomes more oppressed and more laborious; the palpitations are more violent; the pulse is irregular and intermitting, and the patient is very feeble; while very generally, as in other cases of obstructed circulation, the feet swell, then the legs; water is effused into the chest and abdomen, and the patient dies dropsical. Occasionally, in the course of these symptoms, hemorrhage takes place from the lungs.

In the last chapter of this part, which is also the concluding chapter of the work, the author considers the consequences of arctation or partial closure of the coronary arteries of the heart, and the symptoms therewith connected.

A necessary effect of arctation of the coronary arteries, or complete closure of one of them, is diminished supply of arterial blood to the heart, in consequence of which its nutrition is impaired. The imperfect nutrition is made known by the thinness of the walls of the organ and a true atrophied state. The muscular substance is of a less vivid red, softer, more flaccid, and more easily torn than in the healthy state. At the spots where the muscular substance is most wasted, much fat is deposited beneath the cardiac division of the pericardium, and the heart appears covered and enveloped in fat. The thickness of this deposit is one reason, the author thinks, why, in some cases of diseased coronary arteries, the observers have not remarked the attenuated state of the muscular walls of the organ. This atrophy the author distinguishes into concentric, in which the walls are thin and the cavity is diminished, and excentric, in which, while the walls are attenuated, there is evident enlargement of the cavity, the circumference of the heart is increased, and the organ resembles a bladder-like sac or pouch.

Another necessary effect of arctation or partial closure of the coronary arteries, causing impaired nutrition of the heart, is debility in its vital actions. This conclusion, he thinks, must follow on physiological principles, from what is known of the dependence of muscular contractility and energy on the free supply of blood to the muscles.

The author thinks, that the histories of the cases of arctation or partial closure of the coronary arteries, indicate undeniably the existence of a periodical derangement and debility in the movements of the heart. It is known that a particular assemblage of distressing sensations and symptoms was first described by Heberden under the name of *angina pectoris*; and that in no long time afterwards an attempt was made by Jenner, Parry, and Paytherus to connect this assemblage of symptoms with ossification or other disease of the coronary arteries, and in this they were followed by Allan Burns, Kreysig, and others. The external symptoms, which were by Heberden named *angina pectoris*, were, in consequence of some variation in these symptoms, and according to their conceptions of the most essential symptoms, named differently by different authorities;—by Parry, *syncope anginosa*; by Darwin, *asthma dolorificum*; by Sluis, *sternodynia syncopalis*; by Baumes, *sternalgia*; and by Brera, *stenocardia*. It has since been ascertained by Hodgson and several other observers, that the symptoms to which the name of *angina pectoris* was applied, occur in several different diseases of the heart and large vessels, and may take place without affection of the coronary arteries.

This modification in the pathological relations between *angina pectoris* and the state of the coronary arteries, the present author is obliged to admit. After saying that the controversy on the essence, the seat, and the causes of this disease is not yet decided, he allows that, from the facts thus elicited, it results, that the morbid symptoms, which have been represented as a peculiar form of disease under the name of *angina pectoris*, depend on disorder in the energy of the heart, and a periodical attack of debility in its actions. But this cause is not to be sought in any individual, determined, and exclusive diseased condition of the heart, but must be found in very different circumstances and in manifold abnormal conditions of the heart. One of the most frequent causes, he maintains, is undeniably arctation or partial closure of the coronary arteries by albuminous exudation or earthy concretion, by which the free supply of arterial blood to the walls of the heart is impeded or limited, and the nutrition and muscular contractility of the same are enfeebled. But symptoms of *angina* may arise also without morbid changes in the coronary arteries, in peculiar organic diseases of the heart and its valves, and in morbid changes of the aorta, because these produce disturbance in the circulation in the nutrient vessels of the heart, and in its nutrition. Similar symptoms may also take place without evident changes in the heart, in nervous affections and irritations, which derange the functions of the organ. He accordingly arrives at the conclusion already established by Hodgson, that *angina pectoris* cannot be regarded as a substantive or self-existing disease, but as consisting in an assemblage of morbid symptoms, which proceed from disorder in the energy of the heart, but may also be caused by different morbid states.

*Angina pectoris*, like all affections of the organs of circulation, is much more frequent in males than in females. Among a collection of eighty-eight cases of the disease given by Dr Forbes, in eight only were females the subjects. As to age, among eighty-four patients whose age is given, seventy-four were beyond fifty years, and in twelve only was the age below fifty. The disease is therefore incontestably an affection of advanced life. Whether the disease really occurs in children, as Hamilton and Laennec think they have observed, he leaves undetermined. The course of the disease is in general chronic, and it may last for years. Very rarely is it acute. He ought to have added that very often it causes sudden death. Among sixty-four cases of the disease, forty-nine persons died suddenly; and only fifteen recovered or were slightly relieved.

When the energy of the heart in *angina pectoris* is greatly enfeebled, all the symptoms of true swooning come on; the sense of great weakness, paleness, and coldness of the face and extremities, loss of sight, ringing in the ears, inability to move the muscles voluntarily, and loss of consciousness. Respiration is scarcely perceptible; the action of the heart is interrupted; the pulse is scarcely felt; and the skin is covered with a cold sweat. It was from these symptoms that Parry applied to the state the name of *syncope anginosa* or *syncope angens*.

Against the proposition that angina depends on ossification of the coronary arteries, several objections have been made. The first is, that deposits of earthy matter have been found in these arteries in the bodies of persons in whom during life symptoms of angina were not observed. Cases of this kind have been given by Erdmann, Lentin, Warren, Corvisart, Odier, Jurine, Wedemeyer, Abercrombie, and Eichler. From this it is clear that calcareous deposits in the coronary arteries do not necessarily give rise to symptoms of *angina pectoris;* and this also requires explanation. When the deposit of earthy matter is not considerable, the calibre of the artery is not contracted, and the supply of blood to the walls of the heart is not prevented, the nutrition of the organ is not impaired, and its energies are not enfeebled. This was the case in the instance by Warren, in which the ossification was only commencing. But after the calcareous deposits are so manifest, that the arterial canal is thereby remarkably contracted, or even partially closed, or one artery is entirely obliterated, the supply of blood must be interrupted. The heart becomes atrophied, and its contractions are performed with diminished energy. In the cases in which the symptoms were most evident, he contends that the arteries were either sensibly and remarkably narrowed, or one artery was entirely closed.

Against this doctrine it has been further urged, that in the bodies of persons who have suffered from symptoms of *angina pectoris*, no calcareous deposit has been seen in the coronary arteries, nor have these vessels been narrowed. Such is the argument adopted by Hodgson. This state of the coronary arteries is indeed not found in all cases which presented the train of symptoms known by the name of *angina pectoris* and *syncope anginosa.* On the other hand, Percival, Fothergill, Johnstone, Blackall, Jurine, Lobstein, and others have published cases in which no trace of earthy concretion was found in the arteries. Here, however, the author argues, there were for the most part other morbid changes in the heart, diseases of the valves, or attenuation and softening of the heart, by which the circulation of the blood in the nutrient vessels of the heart was equally impeded, in consequence of which, in great muscular efforts or mental affections, the energy of the heart was impaired and symptoms of *angina* took place. Thus in the case by Abercrombie, the left auriculo-ventricular opening was so enlarged that both cavities appeared to make only one, and the mitral valve was insufficient to shut the orifice. Here, he argues, the supply of blood to the heart by the coronary arteries must have been impeded, because the blood during the contraction of the left ventricle must have regurgitated into the auricle, and therefore the supply to the coronary arteries must have been impaired.

In another case to which he refers, though the coronary arteries were not diseased, the heart was loaded with fat, and its walls were most lacerable; and from this he infers that the disease here depends on disturbed nutrition and impaired energy of the organ. Other morbid states with which this symptom has been found in connection are diseases of the semilunar valves of the aorta and the mitral valve, attenuation and softening of the walls of the heart, lacerability of the cardiac walls, and enlargement of the aorta, with calcareous deposition in its walls, and great contraction of the same.

The French physicians have very generally looked on *angina pectoris* as a primary lesion of the nerves, and have considered it as a spasmodic affection of the heart, induced by neuralgia of the thoracic nerves (cardiac), which disorders the function of the heart, and might thereby cause death. Such is the view of Desportes, Jurine, Laennec, Piorry, Bouillaud, and several others of less note. The idea of neuralgia, however, is not new, and was favoured if not maintained by Butter, Macqueen, and Lobstein, who believed it to be one of the forms of misplaced, or irregular, or internal gout,—an idea certainly receiving some countenance from the fact, that the disease is common in the gouty, in persons who are sprung of gouty families, and in those who indulge in the pleasures of the table. The disease or something very like it has been seen also in hysterical females.

On the whole, Professor Tiedemann thinks that the idea of *angina pectoris* being a neuralgia of the cardiac nerves is the most prevalent doctrine among physicians in modern times. But he thinks also that this is a great error, and he maintains that *neuralgia cardiaca* is a totally different disease from *angina pectoris.* In the latter he maintains there is impaired energy of the action of the heart, a total failure of its powers as a muscular and propelling organ. In *neuralgia,* on the other hand, there is a true spasm or cramp of the muscular texture, which causes the feeling of painful constriction, oppression, anxiety, and soreness in the region of the organ. The classes of persons in whom these two affections appear are very different. While neuralgia appears in the young and irritable of delicate constitution, and in females more than in males, genuine angina is a disease of advanced life affecting males, in a very great degree, more than females. While neuralgia is associated most commonly with hysteria and hypochondriasis, with dyspepsia, and the formation of air in the alimentary canal, and in females with *globus hystericus,* angina takes place in the corpulent, the well fed, those who have suffered from gout and rheumatism, or who have previously presented symptoms of disease of the heart.

We have now given an abstract of the principal topics considered by the author in this volume. He has investigated his subject with infinite care, great attention, and the most patient deliberation. Upon it he has bestowed the most extensive research; and his labours may be justly said to present a complete view of the subject in all its aspects and relations. When we consider the work as a whole, any errors, which after all may be differences only in opinion, shrink into insignificance, and are altogether lost amidst the general merits of the performance. These are indeed so great and so uncommon that we doubt whether any other man living could have produced a work like the present; and we certainly fear that no person in this country could have accomplished so great an undertaking. We have only to conclude by saying, that in the present work the pathological reader will for a long series of years find every thing that it is requisite to know on the diseases, and especially the obstructions, arctations, and obliterations of the arterial system, and their multiplied effects.

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## ART. II.—*Confessions of a Homœopathist.* Dublin, London, and Edinburgh, 1846. 12mo, Pp. 399.

OF the wisdom of attempting to explode, to expose, or to put down, as it is termed, popular delusions and vulgar errors, by means of works of fiction, we have always entertained doubts. It may be argued, we know, that all means are proper and fair by which the human mind may be undeceived, by which it may be weaned from errors, and made to relish and love truth and correct dealing. But it is forgotten, amidst all the eloquence and plausibility of this argument, that it must be allowed, and may be justly said, that, for the purpose of correcting one set of errors, delusions, falsehoods, and misrepresentations,—another series of falsehoods is employed; invention is carried to its greatest possible extent in fabricating and imagining facts, scenes, and positions; and in the very endeavour to demonstrate the hurtful effects of error and imposition, the example of imposition is itself brought forward.

By the author of the present performance, however, an argument of a different kind is employed. He allows that the folly and wickedness of homœopathy have been elaborately, and ably, and satisfactorily exposed in the various medical periodicals of the day. But as these are not read by the public, and as it is the public that are chiefly to be undeceived, he thinks that the present mode of presenting the deceits, impositions, and absurdities of homœopathic practitioners in an agreeable form before the public, may tend to open their eyes, and make them understand what a miserable system of arrogant pretension and shameless imposition homœopathy actually is.

In the present performance, nevertheless, we are told there is a foundation in fact. "Circumstances of a peculiar nature made the author acquainted with the history of one of the most successful disciples of Hahnemann. Its details were given by a dying man, painfully aware how near he stood to the barrier which intervenes between time and eternity,—who no longer wished to deceive others, and whose awakened conscience told him he could no longer deceive himself."

"The author has pondered for some years on the propriety of placing these confessions before the public; and he does so now from a feeling that the time demands them, and a conviction that they will prove useful."

Thus it too often happens in the world. A man passes through the course of life a deceiver and impostor, with a daily lie on his lips, and his whole life a series of falsehoods and frauds; and at last, when death has overtaken him and stares him in the face, he thinks it time to become honest, and, by a sort of deathbed repentance, atone for the wickedness and injury done by a whole lifetime of iniquity. It is simply possible that the great Ruler, who daily brings good out of evil, and makes not only the wrath but the iniquities of His creatures to praise Him, though they know it not, nor is it in their hearts, may in the same manner cause this to produce unexpected good. Yet where the soil is bad, the fruits are not likely to be promising. Let us see, however, how this story founded on fact proceeds and what it teaches.

According to the established rules of the Epopoea, and which are understood to be more or less generally applicable to romances, novels, and fictitious narratives of all kinds, we are introduced at once to the hero of the story, the Count von Eisenberg, alias, and formerly Karl Gruber of a nameless hamlet near Leipzig, at two hours after midnight, ordering his lady Amalie, a young German beauty, to prepare to depart from the Schloss Falkenbrun, a castle near the ancient town of Salzburg, at an early hour in the morning, in order to get rid of some English residents whom he cordially hates. A little remonstrance and discussion follows; but the Count, who is a perfect domestic tyrant, cuts all short by decisive orders, which he repeats after quitting the room by the lips of a messenger, that all should be ready for departure at five in the morning. At that hour, therefore, on a frosty morning, they depart from the castle and pine forests of Falkenbrun, pursuing their journey for some hours of the day along the banks of the Salza, and arrive at night at an obscure gasthaus, the Weissen Hirsch or White Stag, a small wayside inn in a mining district of the Tyrol.

Snow fell during the night; and next morning they resume their journey at a pace retarded by that accident in a hilly district. The Count, impatient at their slow progress, gets out of the carriage and mounts one of the attendant's horses, galloping on, at intervals ahead, and at other times encouraging the peasants who had collected to urge on the carriage. All of a sudden horse and man disappear from the earth; and a crash is heard, followed by a plashing sound, such as is heard when a heavy body falls into deep water. Horse and man had fallen into the shaft of an old mine, the mouth of which, overgrown by brambles and other shrubs and covered by snow, had been concealed from sight. The horse, the nobler and better animal of the two, is of course destroyed. But the count is intercepted in his fall by a friendly ledge of stone about thirty feet down. The countess is in the greatest distress; and while the attendants hesitate, she proposes to go down the shaft herself by ropes in order to rescue her husband. From this, however, she is spared by the opportune arrival of two Englishmen attired as sportsmen, with rifles and knapsacks; indeed two Englishmen from whom this German count had run off, for fear they should be too civil to his lady.

One of them, Howard, instantly gets himself secured in ropes, and after first lowering a light which was not extinguished, he descends and finds the count in a state of insensibility, hanging over a ledge about three feet wide, with his head downwards and his feet against the perpendicular wall. The ropes are secured round the body of the count, and he is drawn up, and afterwards his deliverer. An arm and a leg had been broken, and a gash across the face had been inflicted, with some injury of the head. But in a little he began to show symptoms of returning sensibility; the fractured limbs were set; and the sufferer was conveyed on a sort of litter made by the carriage doors to the inn, which they left in the morning. The Englishman, or Irishman rather, who rescued the count, originally a sailor, is now a doctor, and treats his patient on the most approved plans, medical and chirurgical. The other, Forrester, is a well-educated Englishman, of enlightened mind, religious principles, and with strong feelings of rational piety, and he ministers to the mind of the invalid, and finally to that of his lady, religious instruction and spiritual consolation.

From the immediate effects of the accident temporary and partial recovery takes place; and in the meantime, after the feelings of the count had been considerably altered towards the hated English by the spontaneous and kind attention of the two young gentlemen, he is induced to give to them and his lady a history of his life, and, in short, to confess all his multiplied frauds and iniquities.

From this it appears that Karl Gruber was a native of an obscure village near Leipzig; that he was born and brought up amidst the most hopeless and grinding poverty; and that it was the absolute misery of his situation, operating doubtless on a mind of some energy but of no principle, that led him to think of improving his condition by any means, and of raising himself above the den of misery and poverty in which his lot was originally cast. In Germany, as in Scotland, almost every one receives some learning; at least the children must be educated either by their parents or the public. Gruber was not fond of learning; but as it kept him from toil, he learned his tasks; and was recommended to the Elector as one deserving a free university education.

To the university of Leipzig accordingly he went; and there studied neither classics nor mathematics, neither literature nor science, but the characters of the professors; and by discovering the weak sides of some of them, and flattering them in the grossest manner, especially one aged philosopher, the Rector Herr von Hornblenderlande, he obtained the office of curator and custodier of the university museum, with a decent salary.

This, however, was a small matter for a genius so aspiring. His next proceeding was to perform a practical joke or hoax upon another professor, the Herr von Pöble, which had the good effect of depriving that honest gentleman of his professorship, he being found in a state of mystification with strong drink, and his servant girl placed beside him in the same bed.

He then appears in a new character. Amidst his dreams of the best method of rising in the world, he thought of entering into the Holy Catholic Church and becoming a Jesuit; and he imagined that in this way he might some time or other wear the triple crown. With the view of fitting himself for this career, accordingly, he began to practise new and unheard of deceits and impostures in his wretched apartments, amidst a low and ignorant neighbourhood; and by making strange noises, and, when the people came to inquire, always seeming in profound study at his books, he at length made the neighbours believe that he was in league with Satan. This idea was rapidly and greedily adopted by all ranks, and great numbers to such a degree, that it represents Leipzig and its inhabitants to have been the most remarkable place for imbecility, in the nineteenth century. Even two judges and one clergyman are represented to have been figuring within this circle of folly, ignorance, and superstition. The whole of this part of the story appears to be a most improbable fiction.

Karl Gruber now employed a counsel learned in the law to take up his case and raise actions of damages against great numbers of the inhabitants of this incredibly foolish town. Notices were served on the various calumniators and believers in *diablerie;* but none of the cases went to trial. All the parties compromised, privately paying large sums of money in order to escape the ridicule and certain loss which would have followed public trials. In the course of two weeks the lawyer had by this device brought into his treasury 30,000 dollars (Thaler,) equivalent to L.4500, (p. 122,) and the priest afterwards paid for his share in the business 30,000 florins, equivalent to L.2500 more. For this latter piece of Machiavelism Gruber afterwards paid rather dear.

He next treats his father with such neglect and insolence, that the old man dies of what is usually called a broken heart.

After a month's absence from Leipzig to obliterate the traces of this last occurrence, he returned and resumed his plan of studying theology. He had here fallen under the lash of the Rabelais of the university; a certain Fritz Eken, who contrived to render him miserable, and make him long for revenge. The opportunity was not long wanting. By a regiment of Hulans a great assembly or ball was given, at which all the fashion of Leipzig was present. A young lady, Fraulein von Forstheim, from Westphalia, of surpassing beauty, it is said, went with the party of the Provost; and Gruber, who was with the same party, had the honour of waltzing with her. At a change in the music, he lost the time, and in his efforts to regain it, something caught his foot, and he fell at all his length, bringing down with him the lady. Eken was at hand, a witness of this disgrace, and raising the lady consoled her by saying; Kein leid;—Thut nichts; es ist bloss Pfarrerweise dansiren zu konnen. No harm. Never mind. It is only dancing parson fashion. The remarks made only rendered Gruber more fierce and vindictive; and he at length cautioned Eken not to criticise his conduct. The words Morgen Früh, early to-morrow, were speedily uttered; and Gruber left the ball-room to prepare for the meeting. Gruber was victorious. But his opponent's second immediately came up to him, and removing his mask, disclosed the features of the Jesuit preacher, Seifenblase, whom he had amerced; the latter informed him that he would take care that the ranks of the holy church should not be polluted by the presence of a member of such earthly propensities as he had shown himself to be.

This is by no means the first inconsistency in the plot of this fable. But it is the first we notice. Students in theology are not permitted to fight duels; and if such an occurrence is known, it renders the individual liable to dismissal from any school of theology. This Seifenblase knew and acted on. But it appears that persons in holy orders may act as seconds, and this M. Seifenblase did. Whether this be the fact or not, we have at present no means of knowing. But we doubt it much; and we think that Gruber might have just as well caused the degradation and disordination of Seifenblase, as the latter caused the dismissal of Gruber from the school of theology. The offence, indeed, in a priest already in orders was more heinous than in one only a student. Yet here the author of the story represents the priest after officiating as second, that is, as aider and abettor in a duel, retained in the church, while the less flagrant offender is expelled from the school.

Bad, however, as this affair was, it is the beginning of his subsequent career to fortune and to wealth. Expelled from Leipzig, he determines to proceed to Munich. In the Eilwagen, in which he travels, he finds in the hands of the conductor, as a means of lighting his meerschaum, a fragmentary portion of the Organon of Hahnemann, and this he reads for want of anything better to do; and though at the time he entertained no serious thought of the book or its subject, yet some months after he found that it made on his mind an indelible impression.

At Munich he assumed without difficulty, chiefly in consequence of good letters and testimonials from his friends at Leipzig, the same rank which he held at that city. His way of life was, however, still undetermined, nor had he any fixed object in view, since the great one of the church had vanished before him. One day after lecture he entered the library, and on one of the shelves found a perfect copy of his former travelling companion, the Organon. This he read through, and in that we think he had much merit; and then he proceeded to study the other writings of the same great authority. This apparently accidental circumstance settled the business and fixed his fate. He could think of nothing but homœopathy. The subject engrossed his thoughts by day and by night, and as he saw in it simplicity, no labour required, the means of deceiving others by acting on their weak sides, and the probable nay certain means of enriching himself, he hesitated not long. He possessed himself of the degree of doctor in medicine; and as England was the great field for the display of this new wonder, and Englishmen the richest, most liberal, and most foolish people in the world, he at once saw whither he must direct his steps. The whole force of his mind he now directed to acquiring a knowledge of the English language. He meets in the Café or Saal rather, of one of the hotels at Munich, a dealer in Geneva watches, who had been in England, and had been there assistant to a homœopathist. From him he receives lessons and advice over a bottle of champagne; and from the same person, overcome with the genial liquor, he purloins a valuable memorandum book of directions. With this as his guide, he proceeds to London; and finding that field pre-occupied, advances to Manchester, where he finally commences operations.

His success was immediate and remarkable; and would have been incredible and astonishing were it not known that the masses are actuated by such folly. Here is a little of the view behind the scenes.

"A wretched squalid-looking mendicant, apparently covered with leprosy, also caused a school-boy to write a dirty little scrawl, begging me, for God's sake, to cure him, as he had been in all the hospitals, and none of the doctors could. This I threw aside in disgust.

"An elegantly folded note was next presented from Sir H——— G———, requesting that I would favour him with a call as soon as convenient, and stating that a servant waited for an answer.

"I was on the point of sending an affirmative one, when Johan, who had been out, entered the room, and being informed of what I could not help considering extraordinary success, interrupted me, and in most peremptory tone said—'Success, indeed! excuse your humble servitor; but if such success satisfies you, the man has more ambition than the master. Trust me; I know more of these people than you do, and if they find that they can have you for sending for, you will lose half your time, and half your fees. It would be best for you, not to be seen at all out of doors; a little mystery will magnify your presumed powers—consequently, to the Baronet you must not go; rest assured, he will come to you.'

"Kobelt then proceeded to pull down my vanity by clearly demonstrating, that as yet I had been but the puppet, whilst he was the real engineer, who had arranged and pulled the strings.

"'Now,' said he, in continuation, 'come to this window and tell me what you see.'

"'I see a wretched beggar in rags, gesticulating vehemently, and a crowd of curious people laughing at him: now he throws himself upon his knees; he appears to be directing his words towards us. Oh, the horrid wretch! he is all covered over with leprosy; see, he tears open his shirt, whilst the scales are flying off from him on every side, and the crowd are scattering, through fear of contagion.'

"'You have observed accurately; now, tell me, would you like that miserable man for your patient?'

"'No! assuredly. It disgusts me to look at him; besides, I fear homœopathy would hardly cure him'

"'Yet, on that man depends your fortune in this town, and the greater part of the celebrity, which, in a few hours, you have discovered that you possess!!!

"'Master, mind, that despised and leprous mendicant is my brother; there is not a house in this town which he has not visited during the past week—not a Doctor whose advice he has not asked, and scarcely a female whom he has not shocked by the exposure of his noisome person. Now, you shall cure him——'

"'I!'

"'Yes, you; and that you may accomplish it more easily, be it known to your sagacity, that yonder mendicant, who has exhibited his disgusting appearance in every part of the town, and on every possible occasion, (to the great horror of all the correct population, who are invariably of opinion, that unseemly misery and disease should be imprisoned, to prevent a shock being given to eyes refined,) is as free from any complaint as you are; his disease is only simulated for your benefit; it will make a famous case. Now, let me advise you; write to Sir H—— G——, and say, that time will not permit your waiting upon him, but that you will be happy to see him, and extend to him the benefits of your art, at twelve o'clock tomorrow. I shall give the same answer, and appoint the same hour for all the rest who have requested consultations. By that means, they will be all in one another's way, and will reason, that your practice must be immense.' "—Pp. 204—207.

The leprous beggar is accordingly cured in a very short time, and proclaims the unrivalled merits of Herr von Eisenberg.

A day or two after the patient appears.

"The baronet I had declined visiting the previous day now entered. He was a fine stately man, but seemed in great torture, and was assisted into the room by a servant, and the aid of a crutch; he had suffered from gout every where, and I thought I saw evidences of an intellect weakened by constant attacks of pain.

"I immediately hastened to give him a chair, and he dropped into it, as if his knee joints had no power when once bent out of the perpendicular, and when he had drawn his breath, he said with the courteous smile of a gentleman—

" 'Well, Doctor, you have played the part of a tyrant with me, and have caused me to rise from bed, where I have been stretched now three months, and have made me drive five miles. My family physician was with me when I received your reply, and with a very grave face he told me, that he would not be answerable for the consequences, if I persevered in so mad a project as that of driving into Manchester. I told him I should not hold him accountable any longer, thanked him for his attention, gave him his last guinea, and, with the aid of two glasses of brandy, and a little of Hoffman's anodyne, here I am, and I declare I think the fresh cool air has greatly revived me; and although every jolt in the road gave me torture infinite, still I grinned and bore it; but now, sir, that I am roused, I am willing to bear more than that, to get rid of this troublesome complaint.'

"I questioned him closely; he had been a man of great activity, a mighty Nimrod, and had always been in the habit of indulging the good appetite procured by violent exercise; he had, moreover, the reputation of having one of the strongest heads in the shire, whilst his cellar of wines was celebrated far and wide. A disputed election for a neighbouring borough caused a third party to offer him their votes; he yielded to the temptation, and carried off the prize for which the others were contending. The healthy and hearty country gentleman was now lost in the M. P.; he carried with him to London all his eating and drinking propensities, but he could not bring thither the active exercise and bracing field sports, which rendered his little excesses innocuous. Night after night in St Stephen's, half the day in bed, or lounging about the clubs, with perhaps a short ride or walk in the parks, was not sufficient for his powerful frame. A violent fit of indigestion, followed by gout, laid him on his back for some time, and destroyed the relish and spirit he formerly had for all exertion. In this deplorable state he had remained for some years,—now better, now worse. His hunters had all been sold, and he himself, now yielding to his complaint, waited, with pettish anxiety, the daily visit of a really skilful physician, who found it necessary to continue giving wine and stimulants, through fear of the gout attacking his stomach, and thus aimed at suppressing a fire by pouring oil on it.

"Having learned thus much, I told the Baronet that I could cure him, provided that he pledged his word implicitly to follow my directions.

"He promised, and I immediately wrote—

"'Let Sir H—— G——'s coachman receive orders to set him down to-day at one quarter of a mile from home, which distance he will walk, at whatever pace pleases him best; he may have the assistance of a servant. To-morrow Sir H—— G—— is to drive twelve miles, and to be let down half a mile from home. His diet, each day, is to be a single chop, broiled, for dinner, with one glass of Madeira, and water *ad libitum*. Boiled bread and milk for breakfast and supper; nothing to be eaten in the intervals One hundred globules accompany this, one to be taken every hour. In three days I should be glad to see Sir H—— G—— again.'

"I folded this up, and presented it with the globules; then reminding him of his promise, I caused him to be assisted out."—Pp. 213—215.

"The Baronet Sir H—— G—— was gradually restored to his habits of activity, and consequent health; the first use he made of it, was to present me with a splendid thorough-bred hunter, and he never seem satisfied praising my system, my skill, and my success.

"The pimple-faced lady, forced to live a natural life, appeared, after a short time, fairer than ever, at least quite fair enough for a lady with L. 5000 per annum. Who can deny that the globules worked this cure?

"The nervous lady walked and ate, and consequently slept, till she was heartily tired of walking, eating, and sleeping; and dreading that she might acquire the form, as well as the health and strength of a milk-maid, proclaimed herself cured.

"The poor consumptive went, according to my orders, to Devonshire, whence I received a letter almost every week, containing a fee, and a statement of the progress of the malady; these, and all similar letters, Johan answered in terms of sympathy, which would have softened the heart of a nether millstone, and packet after packet of the globules was sent, some of which produced wonderfully good effects, and others quite the contrary, which was very odd, as they were all precisely similar, and contained nothing but sugar and starch. When at last, on the approach of winter, she was confined altogether to her bed, I recommended her mother to call in some physician in the neighbourhood. It was done; as a matter of course, the regular practitioner put a stop to the homœopathic treatment; she sunk rapidly, and homœopathy escaped unscathed. Perhaps, thought her friends, if it had been continued, she might have survived. One thing is certain, that her executors had two hundred guineas less to account for, than if she had not enjoyed the benefit of my valuable aid.

"For three years I pursued this course with extraordinary success, and without meeting any contre-tems worth mentioning. I had realized a considerable sum of money, and was growing, perhaps, a little more incautious in my practice than formerly, when events of a peculiar nature occurred, which considerably disturbed my tranquillity, and rendered the remainder of my sojourn in England, although profitable, a series of harassing and perplexing disquietudes."—Pp. 226—227.

A new scene then opens, and a new performer appears on the stage. A strongly-built herculean Englishman of fortune named Smith brings for advice his daughter, evidently far advanced in consumption. Advice is given in the usual way, and continued for a considerable time by correspondence; fees being uniformly, except on one occasion, enclosed. The daughter at first seems to get better. In the meantime the father has a thorn run into his knee in forcing his way through a hedge; inflammation follows, with suppuration within and around the joint. He consults the homœopath, who recommends champooing, which only makes matters worse. Sinuses are formed; the whole joint is destroyed; and the mild Abernethy amputates the limb. The young lady dies of pulmonary hæmorrhage almost immediately after. The old gentleman recovers; but only to breathe vengence and threaten punishment on the unfortunate homœopath.

In the mean while a little episode or by-play is introduced. A delicate young lady, dyspeptic, chlorotic, and amenorrhœal, is brought to the homœopath. He recommends regular hours with horse exercise, and cures her. He eventually falls in love with her; and for a time he is favourably received. At length, however, it turns out that the lady is cousin of the consumptive Miss Smith, whose father had lost his leg in consequence of the homœopathic treatment, or rather his own folly. The uncle is furious, discovers that the homœopathist is an impostor, exposes him to the niece, who breaks off all connection. Then one fine day, when the homœopathic Doctor is in the burying-ground, where repose the remains of Miss Smith, the father, coming to see a marble monument recently erected to the memory of his daughter, recognises him, and after a suitable address, fells him to the earth by a blow on the head with his crutch. Smith himself in the extremity of his rage falls into a fit of apoplexy; and the two men in a state of insensibility are carried off by the assistants of the sculptor.

Both are treated allopathically; and both recover. But the homœopathist finding now that the neighbourhood of Manchester was hurtful to his health, removes first to Chester and then to Liverpool. Here he continues on a small scale but with success his homœopathic practices; and, to diversify business with recreation, he has a gig or pleasure boat on the Mersey. One bright summer evening, however, the Mermaid with the homœopath is boarded by a large six-oared boat with a stout gentleman in the stern sheets, in whom the homœopathist recognises his old enemy Smith, who instantly seizes him and immerses him repeatedly in the water until he is thoroughly frightened, nearly drowned, and completely out of breath.

This little affair showed clearly that Liverpool was no place for the doctor. He accordingly sold his practice, and attempted successively Glasgow, Edinburgh, and Paisley, when another mishap suggested to him the advantage of a tour to the lake districts of Perthshire. Here one fine day, when he is boating with his faithful attendant Johan Kobelt, on Loch Katrine, the everlasting Smith, with his wooden leg, appears in the combined character of tourist and angler, with a mighty fishing-rod and various flies; and throwing with great dexterity hook after hook, succeeds in fishing both master and man, and landing them fairly on the beach of the island, where he first beats them well with the rope's end, then ties the two together, next deliberately cuts the hooks out of the skin with his knife, then pushes them into the water with the pretext of washing, but with the effect of nearly drowning them, and leaves them to the tender mercies of the next visiting party, who a few hours after unbound them both, stiff and immovable.

He had now almost resolved to leave the land of John Bull and gold sovereigns. But he found his heart still lusting after these desirable objects. And under the influence of this appetite he attempted Birmingham, where he thought some more money might be collected. By unequivocal indications, however, he speedily learned that his ancient foe was ready again to torment and embitter if not to destroy his existence; and he prudently determined to return to Germany with all his wealth. His first point appears to have been Rotterdam, then Paris, where he procured by particular influence the title of Count from a German elector. Hence he appears to have proceeded to Nassau and Schlangenbad, where he met the lady whom he afterwards married. Then he settled at the Schloss of Falkenbrun, near Salzburg, and spent there a whole year, when one night at a Cassino table he met the dreaded Smith, who again recognised him, and again pursued him to torment him. And it was partly in fleeing from this dreadful man, partly from the general horror at all Englishmen with which Smith's conduct had inspired him, that he was leaving Falkenbrun on that inauspicious day, when he fell down the shaft of the old mine.

Such is the outline of the story as given by the hero himself. A few circumstances only require to be added in order to complete the narrative.

Whether from the shock and concussion of the fall down the shaft, or from other causes, it was clear that now the homœopathist was stretched on that couch from which he was no more to rise. Symptoms of disease had appeared in the lungs, and he had one or two attacks of hemorrhage. Remorse also, and conscience late but at last awakened was doing its business. Luckily the physician for the soul as well as for the body was at hand; and Forrester, the English traveller, had gradually brought him to know the value of the consolation imparted by the gospel. He arranged all his worldly affairs, leaving all to his wife, except a legacy to his sister if alive, and similar bequests to other friends. When he was reduced to the greatest weakness, and listening to his friend reading the scriptures, a Carmelite monk appears; and in him the count recognizes his old foe Seifenblase, who offers him the last aids of the Romish Church, but which the count has sense and firmness enough civilly to decline. After declaring his confidence in the promises of the gospel, and denouncing the ceremonies of the Romish church, he reveals himself as Karl Gruber, and nearly kills the astonished monk with surprise. Then as a winding up to the whole, Smith appears once more on the stage, turns off the monk, makes a deathbed reconciliation with the count, attends him for the few remaining days of life with as much tenderness and affection as his nature admits, but, true to his character, ceases not to agonize the soul as he had formerly tormented the body of his victim, by extorting from the dying man confessions of the falsehood and inefficacy of his art. The count dies, and is interred, according to the rites of the English church, in the burying-ground of a small chapel not distant from the White Stag.

The Countess attends the funeral procession; but falls into a hysterical and fainting fit immediately after the ceremony is completed. Smith, with his usual activity, discovers a donkey cart belonging to a female pedlar, whom curiosity had drawn to the spot. Upon this cart the Countess is laid, while the young woman supports her head till they return to the White Stag. At the door of the inn the Countess recovers sensibility, opens her eyes, and beholds before her a female likeness of her departed husband. It was Antonia Gruber from Leipzic, the sister of the Count. Another fainting fit succeeds, but eventually goes off.

Then comes the final winding up. After a reasonable time of weeping and wailing, Howard and Miss Fortescue, the sailor doctor, and the cousin of Miss Smith, are united in the bands of matrimony; and the pious and sanctified Forrester converts the mourning German Countess, the widowed Amalie, into a consoled English wife.

The story abounds in the most improbable fictions, some of which we have already noticed. Others not yet mentioned betray some frightful pieces of bad management. The redoubtable Smith

Smithson Smith is a most perfect failure. The author repeatdely brings him forward as a specimen of a well-bred Englishman rich, generous, and gentleman-like. Never was a greater mistake committed. He is the most shocking specimen of a brutal savage ever created by the human imagination. No English gentleman, however much injured he might conceive himself to be, would behave as Smith does. No English gentleman would degrade himself by persecuting a miserable foreigner, however guilty, and however deserving of persecution and punishment, in the manner in which Smithson Smith is represented to have punished Eisenberg. No English gentleman properly so called ever converts himself into a being so degraded as an executioner. Then come the brutal cruelty of even pursuing the unfortunate man in every way in his own country; and the tardy reconciliation, when the Count is within three or four days of death. Such mean vindictive malice, we are confident, no Englishman would ever harbour; such cat-like cruelty and torture no Englishman would ever degrade himself by practising.

The pious and sanctified Forrester is also intended as a perfect character. Yet it is perfectly clear that this pious individual begins to cast loving eyes on the Countess Amalie, while she is yet a wife, and before her husband is dead. In proof of this we merely refer to the scenes described at page 66, and afterwards in page 376.

The main question, however, is, does the moral of the story prove the fallacy, the imposition, the shallow pretensions, and the wickedness of homœopathy. Will it convince the public of these, and will it prevent more victims from falling into the snares of the homœopathists. We believe confidently that it will not, and that no performance of the kind can accomplish such a feat.

The author of the present story no doubt intended to prove the wickedness and the fallaciousness of homœopathy. We do not see that this required to be proved; and we do not think that he has added one single fact or argument to those already known on the subject. He has indeed shown, as has been repeatedly before done, that where homœopathic treatment avails, it is by regulating and restricting diet. And in doing this, indeed, he proves, as has also before been done, that homœopathic practitioners are guilty either of ignorance or want of candour, in ascribing to the globules and infinitesimal doses, the recoveries which are owing to dietetic restrictions. One thing, however, he has completely succeeded in proving; and that is the weakness, the folly, the silliness, and, it may be added, the glaring inconsistency of those who consult and employ homœopathists. Were it not for such ferocious barbarians as Smithson Smith, and such weak and imbecile persons as the baronets, and the rich over-fed and under-worked ladies who consulted Eisenberg, there would neither be homœopathists nor homœopathy. It is quite absurd, unreasonable, and inconsistent to complain of the homœopathists, and to lay to their charge all the folly, all the evil, all the imposition, and all the fraud and quackery, which the practice of homœopathy implies and produces. These men are merely small instruments, useful no doubt in performing their own part in the great farce of human delusion; but without a large amount of ignorance, folly, credulity, inconsistency, and total want of judgment, in the public and those who consult them, their occupation would be gone and their calling naught. All the homœopathists may be distinguished into two orders; one the weakest and most imbecile, and most contemptible in point of judgment and intellect, of all the creatures moving on this earth, with just enough of cunning to study and turn to their own interest the weakness of their fellow creatures, but with little knowledge, and that vague, loose, and inaccurate, no judgment and no reasoning powers; the other consisting of persons a little more cunning and with some degree of cleverness, but no genuine strength of mind, and without any true intellect. Has a single work or literary or scientific production by any homœopathic writer, deserving the serious attention of any rational being, ever issued from the press? Not one that we know of. Not even the absurdly eulogised writings of the great founder of the sect, which indeed are nothing but a series of idle frivolous statements, gross misrepresentations and foolish maunderings, like the unconnected ravings of a drunken philosopher. To this we add both parties give evidence of being totally innocent of anything like principle.

It is not such persons as these who are able to make any permanent impression on the thoughts, the actions, or the character of society. What, then, it is asked, is the cause of the occasional, or partial, or temporary success of homœopathic practitioners? Simply, we answer, the ignorance, the weakness, and the credulity of the public. All quackery and delusion, all imposture and pretension, owe their origin and the success which they obtain to the state of the public mind, very rarely to the ingenuity or cleverness of their professors; and even the small degree of ingenuity, or cunning rather, which they show, could not be availing without the greatest stupidity and ignorance in the public mind. Medicine, in truth, and the medical profession are placed in peculiar circumstances. The real difficulties of the art of healing and the actual good which it produces are by the public neither known nor appreciated. Much less are the merits of its professors and practitioners known; and very few are capable of judging of the degree of talent and ability required to distinguish the presence and extent and nature of disease, and the proper method of treatment. Observers even of considerable acuteness see only results; but of the multiplied connecting or unconnected circumstances they can form no just judgment. The public know nothing of the human body, how it becomes diseased, or how it becomes healthy; and they are equally ignorant of the part which the physician performs in recognizing and managing the state of disease, or contributing to the restoration of health. A man is ill of an apparently trifling disorder and dies; and perhaps those who hear of the event as an unexpected one, think that the physician, if he has been called, has not understood the disorder, as it is said, or has not used the proper remedy. Another man is very ill and recovers; and the physician is extolled as a miracle of medical skill and experience, as one before whom disease must vanish, and approaching death itself be obliged to retire. It is ninety-nine chances to one that in both cases the conclusion is erroneous. In the first case the physician is not in fault, nor to be blamed; in the second case it is doubful if he is entitled to the credit which he has received; perhaps certain that he is not. In all these and many similar cases the public are quite unable to judge; and when the judgment is formed, it is almost certainly erroneous.

There is further in the mind of that most sagacious and many-headed animal the public, an insatiable love of novelty, a degree of readiness to listen to strong assertions, a propensity to believe the most extravagant promises and protestations, and, in short, a love to be deceived. It is upon the existence of this principle in the human breast that depends the success of every species of delusion, deception, fraud, imposition, and quackery. It is of no consequence under what shape it presents itself, homœopathy, hydropathy, animal magnetism, or any other variety of fraudulent and impudent pretension. All are in this respect upon the same footing; all appeal to the same principle; and all calculate, and calculate correctly, that mankind will in the same circumstances act in the same way. Promise liberally, protest strongly, assert boldly, and the world are sure to believe. The incredulity and scepticism of a few are of no moment. These are exceptions to the rule. "Considering that natural disposition in many cases to lie, and in multitudes to believe," says a great observer of mankind and society, "I have been perplexed what to do with that maxim so frequent in everybody's mouth, that truth will at last prevail." The truth is, that it does not always prevail. In a large proportion of cases falsehood and misrepresentation prevail; and when truth does at last prevail, it is only after an immensity of mischief has been perpetrated and much evil has been done.

For these reasons every attempt like the present to undeceive the public will fail, and cannot but fail so long as the constitution of the human mind continues the same. So long as mankind are ignorant and credulous, so long as they hanker after novelty, and have a love for the marvellous, so long will delusion and imposition prevail, and so long will it be impossible to convince them that homœopathy is either a shallow pretence or a piece of impudent quackery. So long also as there are in this island so many persons who have too much wealth and too little to do, too much to eat and drink, and too little labour to perform, it will continue a field sufficiently fertile for the thriving of homœopathy, hydropathy, animal magnetism, or whatever be the next denomination in which quackery is to rejoice. Circumstances like those now specified are most favourable to the development of dyspeptic disorders in every form, the multiplied and varying tribe of nervous, hysterical, and hypochondriacal affections; and in these it is that homœopathy shows its power. In genuine disease and in all organic affections, in all inflammatory disorders tending to disorganization, it is inert, powerless, and unavailing. Supposing that some violent and outrageous madman like Smithson Smith, discovers after his daughter's death and the loss of his own limb, the futility of the pretensions of homœopathy; and with the same consistent violence and fury proceeds to torment and persecute the supposed cause of his losses; still some other Smithson Smith starts up and runs the same course. These persons never think that they are themselves to blame, and they are themselves the authors of their own misfortunes. This, however, is the first question which they ought to propose to their own hearts; and not lay the whole blame on the comparatively innocent homœopathists. These persons we have always regarded as most unjustly treated, and made to answer for evils and calamities in which they had very little share. Surely they are not to be blamed because the public are so foolish as to place confidence in them; for it may be observed, that if the public did not place confidence in homœopathy and homœopathists, they would still require some other form of quackery to trust to.

Farther, it is not common for people who have once entered on this foolish career ever to depart from it; for that would be a confession of having been wrong, having committed an error; and this avowal it is ever mortifying to human pride to make. The result is, that of the multitudes who have placed confidence in homœopathy, but a very small proportion ever acknowledge that they were in the wrong, or that they have been deceived. The great masses still commend the globules and the infinitesimal doses, and believe that they can work miracles. For one violent and outrageous Smithson Smith, there are hundreds, nay thousands, who, having once believed, believe to the last.

What is to be done, then, some one will say? Are we to leave the public to be deceived and imposed on by this great and foolish piece of quackery? Is homœopathy to be allowed to flourish uncontrolled to the detriment of those that are really ill, and to the discredit of the art of healing. Certainly the wisest and least hurtful course is to let it alone; to leave it to the undisturbed possession of all the foolish persons, old and young, male and female, rich and poor, who choose to apply to it. Ephraim is given to idols; let him alone. If the votaries of homœopathy be allowed to retain their toy, we have no doubt that the weakness of the system will be discovered and admitted by others. If they are disturbed and interrupted in its enjoyment, then the system acquires a degree of importance which it never before possessed; and it is valued in proportion to the opposition made to it. We do not think that it is either proper or desirable that the genuine votaries of homœopathy be converted from it; and we have already said that we doubt the practicability of converting them. Their minds are so constructed and disposed that if they did not worship that folly, they would worship another; and perhaps it is as harmless a species of idolatry as they can well be addicted to. The reign of quackery will never entirely cease.

All that reasonably can be expected to be done, is that, as intelligence extends, as the minds of the great vulgar become enlightened, and emancipated from the sway of prejudice and folly, the number of those who trust in homœopathy or some other similar folly may be diminished. As to homœopathy itself its star is already on the wane. After it was partially or completely discarded from various places on the continent, it drifted over here, and was received by these feeble spirits, who think that novelty is discovery, and that what is strange is likewise to be admired and valued. But even now the wonder, when more closely contemplated, has ceased to attract attention; and in no long time it will quietly take its place in the history of human delusion, as one of those things which should be remembered only to be avoided and despised.

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## Art. III.—*A System of Chirurgery* by J. M. Chelius, D. M. et C., Public Professor of General and Ophthalmic Surgery, Director of the Chirurgical and Ophthalmic Clinic in the University of Heidelberg, &c. &c. &c. Translated from the German, and accompanied with additional Notes and Observations. By J. F. South Professor of Surgery to the Royal College of Surgeons of England, and Surgeon to St Thomas's Hospital. Vol. I. 8vo, pp. 814. London, 1845.

The work of Professor Chelius of Heidelberg has for several years held the character of being the most ample and instructive system of chirurgical knowledge in Germany; and we might add that it will bear comparison with any of those which have issued from the French or Italian press. More condensed and precise than the work of Boyer, and in several respects superior to that of Velpeau, it makes, in its critical character and general merits, a nearer approach to the classical work of Monteggia than any treatise of recent years. The work of the learned Italian surgeon has now indeed in several respects fallen behind the present state of knowledge as to the operative department. In pathology and principle it may be still advantageously referred to. But as the progress of all practical arts is in a constant state of fluctuation and advance, and as surgery has greatly shared in the general improvement, the most perfect treatises require from time to time to be enlarged, rectified, and improved, or must be partially or completely superseded by more recent and more perfect systems.

It is very much for the reasons now assigned that the work of Professor Chelius has acquired a prominent position as an authority in surgical pathology and practice during the last ten or twelve years. Yet so imperfect are all the efforts of human talent, industry, and learning, that this work has itself suffered in the general improvement of surgical practice.

It is partly on this account, and partly to render it more complete as a great surgical authority, that Mr South, in introducing the work of Chelius to the English reader, has added largely to every part of the treatise. The text of the original forms but a small part of the work. A very complete commentary, in the shape of annotations and additions, is added; and wherever the original is too brief or too meagre,—wherever the author does not seem to understand or appreciate the whole improvements of modern English surgery,—wherever on any subject less complete information than the surgeon requires is given, or where given, it is not given in the proper manner, Mr South has, with a remarkable union of learning, knowledge, judgment, and good sense, introduced from all the best authorities the proper and requisite information.

This translation has been proceeding in successive numbers for twelve months. It is not yet completed, and perhaps any notice may be deemed premature. Yet, as the whole first volume and part of the second have now been some time before the public, we think it right to direct the attention of our surgical readers to a work, in which they will find excellent and satisfactory information communicated in a methodical and pleasing manner.

The arrangement of the original is adopted and retained. But among other improvements a very full and methodical list of works, treatises, or essays on particular subjects is prefixed to each chapter on every subject.

The arrangement of the treatise of Professor Chelius may be understood from the following tabular view.

"I. Division.—*Of Inflammation.*

1. *Of inflammation in general.*
2. *Of some peculiar kinds of inflammation.*
    *a.* Of erysipelas; *b.* Of burns; *c.* Of frost-bite; *d.* Of boils; *e.* Of carbuncle.
3. *Of inflammation in some special organs.*

*a*. Of inflammation of the tonsils; *b*. Of the parotid gland; *c*. Of the breasts; *d*. Of the urethra; *e*. Of the testicle; *f*. Of the muscles of the loins; *g*. Of the nail-joints; *h*. Of the joints, viz.

a. of the synovial membrane; b. of the cartilages; c. of the joint-ends of the bones, viz. *aa*. in the hip-joint; *bb*. in the shoulder-joint; *cc*. in the knee-joint; and so on.

## II. Division.—*Diseases which consist in a disturbance of physical connection.*

- I. *Fresh solutions of continuity.*
  - A. Wounds; B. Fractures.
- II. *Old solutions.*
  - A. Which do not suppurate, viz.
    - *a*. False joints; *b*. Hare-lip; *c*. Cleft in the soft palate; *d*. Old rupture of the female perineum.
  - B. Which do suppurate, viz.
- i. *Ulcers.*
  - 1. In general.
  - 2. In particular.
    - *a*. Atonic; *b*. Scorbutic; *c*. Scrofulous; *d*. Gouty; *e*. Impetiginous; *f*. Venereal; *g*. Bony ulcers or caries.
- ii. *Fistulas.*
  - *a*. Salivary fistula; *b*. Biliary fistula; *c*. Fæcal fistula and artificial anus; *d*. Anal fistula; *e*. Urinary fistula.
- III. *Solutions of continuity by changed position of parts.*
  - 1. Dislocations; 2. Ruptures; 3. Prolapses; 4. Distortions.
- IV. *Solutions of continuity by unnatural distension.*
  - 1. In the arteries, aneurisms; 2. In the veins, varices; 3. In the capillary-vascular system, teleangiectasis.

## III. Division.—*Diseases dependent on the unnatural adhesion of parts.*

1. Ankylosis of the joint-ends of bones; 2. Growing together and narrowing of the aperture of the nostrils; Unnatural adhesion of the tongue; 4. Adhesion of the gums to the cheeks; 5. Narrowing of the œsophagus; 6. Closing and narrowing of the rectum; Growing together and narrowing of the prepuce; 8. Narrowing and closing of the urethra; 9. Closing and narrowing of the vagina and of the mouth of the womb.

## IV. Division.—*Foreign bodies.*

- 1. *Foreign bodies externally introduced into our organism.*
  - *a*. into the nose; *b*. into the mouth; *c*. into the gullet and intestinal canal; *d*. into the wind-pipe.
- 2. *Foreign bodies formed in our organism by the retention of natural products.*
  - A. Retentions in their proper cavities and receptacles.
    - *a*. Ranula; *b*. Retention of urine; *c*. Retention of the fœtus in the womb or in the cavity of the belly (Cæsarean operation, section of the pubic symphisis, section of the belly.)

B. Extravasation external to the proper cavities or receptacles.
a. Blood swellings on the heads of new-born children; b. Hæmatocele; c. Collections of blood in joints.

3. *Foreign bodies resulting from the accumulation of unnatural secreted fluids.*
a. Lymphatic swellings; b. Dropsy of joints; c. Dropsy of the bursæ mucosæ; d. Water in the head, spina bifida; e. Water in the chest and empyema; f. Dropsy of the pericardium; g. Dropsy of the belly; h. Dropsy of the ovary; i. Hydrocele.

4. *Foreign bodies produced from the concretion of secreted fluids.*

V. DIVISION.—*Diseases which consist in the degeneration of organic parts, or in the production of new structures.*

1. Enlargement of the tongue; 2. Bronchocele; 3. Enlarged clitoris; 4. Warts; 5. Bunions; 6. Horny growths; 7. Bony growths; 8. Fungus of the dura mater; 9. Fatty swellings; 10. Encysted swellings; 11. Cartilaginous bodies in joints; 12. Sarcoma; 13. Medullary fungus; 14. Polypus; 15. Cancer.

VI. DIVISION.—*Loss of organic parts.*

1. *Organic replacement of already lost parts*, especially of the face, according to the Tagliacozian and Indian methods.
2. *Mechanical replacement:* Application of artificial limbs, and so on.

VII. DIVISION.—*Superfluity of organic parts.*

VIII. DIVISION.—*Display of the elementary management of surgical operations.*

*General surgical operations:* Bleeding, cupping, application of issues, introduction of setons, amputations, resections, and so on." Pp. 3–5.

The work of Chelius consists of text, and a series of annotations or remarks. In the former the principles and practice, as established by the best authorities in modern times, are delivered. In the latter are presented many points of information, which, though necessary to be known, could not be properly given in the text, without impairing unity and injuring arrangement. In some instances these annotations give full and elaborate explanations of points stated dogmatically or aphoristically in the text. In other instances they contain illustrations of various principles delivered in the text. And in some instances they contain details of cases calculated to illustrate or confirm also the previous statements.

Besides these annotations and explanations by the author, there are, as has been already said, still more ample and minute annotations by the translator and editor Mr South. These form a very valuable part of the treatise, and will be particularly useful to the English reader, because they are principally employed in furnishing, from English practice and experience, illustrations suited to English surgery. Of the merit of these annotations we have already spoke in general terms; and we do not see that we can with propriety either add to them or modify them. We would merely observe, that by these additional annotations Mr South promises to render this work the most ample and instructive in surgical pathology and therapeutics in the English language.

Any formal analysis of a work so comprehensive and so detailed it would be impossible in these pages to give. We might indeed give a view of the present state of surgery, for which it affords useful materials. But it is better that our readers seek in the work itself the information which it contains; and we strongly recommend all surgical practitioners and students who have not yet looked into this work to provide themselves with it without delay and study its pages diligently and deliberately.

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## ART. IV.—*Abstract of* "*Researches on Magnetism and on certain allied Subjects,*" *including a supposed new Imponderable.* By Baron VON REICHENBACH. Translated and abridged from the German by WILLIAM GREGORY, M. D., F.R.S.E., M.R.I.A., Professor of Chemistry. London, 1846. Pp. 112.

THE statements made in these pages we print without either remark or comment. It is proper that they should be known; and we have no doubt that many will be anxious to know them, and will read them with some interest. On their correctness, however, and their authenticity we give no opinion. Nor do we think it proper to draw from them any inferences or conclusions. All that can be said at present is, that they may illustrate a part of the natural history of the human mind.

" The first of these is the so-called Animal Magnetism. The author has demonstrated that magnets act on the human body, especially in certain conditions; and thus restores to the statements of the early magnetisers on this point the credit of which they had been unjustly deprived. The author's experiments are the more valuable, because, as far as the present memoir extends, he never experimented with persons in what is called the mesmeric state.

But he goes farther; for he demonstrates the existence, *in magnets*, of two forces; one which attracts iron and affects the needle, and one which acts on the nervous system, and which he has found, unmixed, *in crystals*. This new force he is disposed to view as the true agent in Animal Magnetism, At all events, it is so in the magnet, when it acts on the system.

" This new power is transferable from one body to another, and it is conductible through matter. A body may be, for a time, charged with it, and this is the true explanation of the fact, now demonstrated by the author, that a glass of water, as stated by Mesmer and his followers, may be magnetised by contact with a magnet, although that term is improper.

" But perhaps the most striking characters of this new power are, that it assumes, like electricity and magnetism, a polar arrangement in bodies. and that bodies charged with it are luminous, especially at the poles. The light, it is true, is only visible to certain sensitive individuals; but not only are such persons of tolerably frequent occurrence, but the author has gone far towards demonstrating, that, although invisible to ordinary eyes, actual light, nevertheless, does emanate from the poles of powerful magnets. It is very interesting to remark that Baron von Reichenbach's discovery of the luminous appearance connected with the magnet has been so soon confirmed by the researches of Faraday.

" The author's conclusion that the new power, existing as it does in crystals, as well as in magnets, plays an important part in crystallisation, has also received powerful confirmation from the recent researches of Mr Hunt on the influence of magnets on crystallisation.

" The author finds the new power in many unsuspected quarters, in the sun's rays, the moon's rays, heat, electricity, friction, and above all, chemical action; and the numerous and beautiful applications which at once suggest themselves give a tenfold interest to this part of his researches. The human frame, especially the hand, whether in virtue of the incessant chemical changes going on in the body, or independently, is a rich source of the new power; and when we reflect on the author's facts, demonstrating the existence in almost all forms of matter, and especially in the human hand, of an influence, no matter of what nature, capable of acting on the sensitive nervous system, we see at once the true explanation of the results of Haygarth and others, who supposed that they proved metallic tractors to be quite inert, because the same effects (attributed by them to imagination) were obtained with tractors of wood and other substances painted so as to resemble the metallic ones. We perceive that, in both cases, the hand may have been the chief agent, and that at all events both metal and wood, as well as many other bodies, are capable of acting on the system in the same way, that is, in sensitive persons. The error of Perkins, who recommended metallic tractors, as well as of his followers, seems to have been this, that, *on theoretical grounds,* they supposed the influence observed to exist in metals, or rather in iron alone. His opponents, in combating this notion, have supplied ample evidence that the influence exists in other bodies. Viewed in this sense, these experiments serve to illustrate the author's, and are at the same time illustrated by them; and they are beyond suspicion, both from the respectability of Dr Haygarth and his friends, and the very different object they had in view."—Pp.v–vii.

" Into the question, whether the new influence detected by the author in magnets, in crystals, in light, heat, electricity, and chemical action, be due to the existence of a new imponderable, it would be premature to enter here. The author, adopting this view, gives it a name, and certainly the laws of its diffusion and distribution, as well as its very analogous characters, would induce us to place it beside magnetism and electricity, as a force distinct, yet of the same kind. It is very interesting to observe that Professor Draper of New York, from considerations connected with photogenic influences, admits a fourth imponderable as existing in the sun's rays. The current of discovery seems to set in that direction; and this is one more coincidence, strongly confirmatory of the author's accuracy and sagacity. He has certainly advanced farther than all others towards the establishment of his new imponderable; and it would not be easy to exaggerate the importance, especially to chemistry and to medicine, of such a discovery if finally confirmed.

"The most recent researches of Faraday, of which a very imperfect account has just appeared, evidently establish the existence of a new class of facts, related to magnetism; and without attempting to show how far these researches may coincide with, or differ from, those of Reichenbach, this at least is evident, namely, that, in connection with magnetism, much remains to be discovered.

"It is also worthy of notice, that, in a pamphlet lately published in Calcutta by Dr Esdaile, that author comes to the following conclusions, among others, all supported by very numerous facts: 1*st*, That there exists, in the human frame, an influence capable of being transferred from one body to another, and of affecting a sensitive person at considerable distances. To this power he attributes all mesmeric phenomena. And, 2*d*, That water can be charged with this power; and that water so charged is at once distinguished from ordinary water by the sensitive, on whom it acts very powerfully. The attentive reader will easily perceive how the experiments of Dr Esdaile, made at so great a distance, about the same time, and in an entirely different manner, confirm and illustrate those of Reichenbach, by which they are, in turn, confirmed and illustrated."—Pp. viii, ix.

"Magnets of 10 lb. supporting power, when drawn along the body, downwards, without contact, produce certain sensations in a certain proportion of human beings. Occasionally in 20, 3 or 4 sensitive individuals are found; and in one case, out of 22 females, examined by the author, 18 were found sensitive.

"The sensation is rather unpleasant than agreeable, and is like an *aura*, in some cases warm, in others cool; or it may be a pricking, or a sensation of the creeping of insects on the skin; sometimes headach comes rapidly on. These effects occur when the patient does not see the magnet nor know what is doing; they occur both in males and females, although more frequently in females; they are sometimes seen in strong healthy people, but oftener in those whose health, though good, is not so vigorous, and in what are called nervous persons. Children are frequently found to be sensitive. Persons affected with spasmodic diseases, those who suffer from epilepsy, catalepsy, chorea, paralysis, and hysteria, are particularly sensitive. Lunatics and somnambulists are uniformly sensitive.

"The magnet is consequently an agent capable of affecting the living body; but although some physicians have attempted to employ the magnet as a curative agent, no fixed or decided results have been attained The subject, having a close connection with physiology, on the one hand, and physics on the other, has been neglected both by physiologists and natural philosophers; while among medical men it has not always fallen into the best hands, The object of the author is to solve some of the disputed questions, and to bring a number of the phenomena under fixed physical laws.

"1. Healthy sensitive subjects observe nothing farther than the sensations above noticed, and experience no inconvenience from the approach of magnets. But the diseased sensitive subjects experience different sensations, often disagreeable, and occasionally giving rise to fainting, to attacks of catalepsy, or to spasm so violent that they might possibly endanger life. In such cases, which generally include somnambulists, there occurs an extraordinary acuteness of the senses; smell and taste, for example, become astonishingly delicate and acute; many kinds of food become intolerable, and the perfumes, most agreeable at other times, become offensive. The patients hear and understand what is spoken three or four rooms off, and their vision is often so irritable, that, on the one hand, they cannot endure the sun's light or that of a fire; while, on the other, they are able, in very dark rooms, to distinguish not only the outlines, but also the colours of objects, where healthy people cannot distinguish any thing at all. Up to this point, however strange the phenomena, there is nothing which may not easily be conceived, since animals and men differ very much in the acuteness of the senses, as is daily experienced.

"2. The author had the opportunity of studying a patient, Mlle. Nowotny, aged 25, subject for eight years to headachs, increasing in severity, and latterly affected with cataleptic fits, accompanied with spasms both tonic and clonic. She possessed a very high degree of acuteness of the senses; she could not endure the daylight, and in a dark night perceived her room as well lighted as it appeared to others in the twilight, so that she could quite well distinguish colours.

"She was very sensitive in various ways, to the influence of the magnet, and although not somnambulist, was quite equal to somnambulists in the acuteness and excitability of the senses.

"Considering these things and remembering that the *aurora borealis* appears to be a phenomenon connected with terrestrial magnetism or electro-magnetism, it occurred to the author that possibly a patient of such acuteness of vision might see some luminous phenomenon about the magnet. Dr von Eisenstein, who took much interest in these and in all the subsequent experiments, gave every facility to the author in his researches.

"3. The first experiment was made by the patient's father. In profound darkness, a horse-shoe magnet of 9 elements, capable of carrying 80 lb., was presented to the patient, the armature being removed; and she saw a distinct and continued luminous appearance, which uniformly disappeared when the armature was applied.

"The second experiment wasmade as follows, onher recovery from a cataleptic attack, when the excitability of her senses was greatest. The room being artificially darkened, and the candles extinguished before the fit was ended, the magnet was placed on a table, 10 feet from the patient, with the poles upwards, and the armature removed. None of the bystanders could see anything whatever, but the patient saw two luminous objects, one at each pole, which disappeared on joining the poles, and re-appeared on removing the armature. At the moment of breaking contact, the light was somewhat stronger. The appearance was the same at both poles, without any apparent tendency to unite. Next to the metal she described a luminous vapour, surrounded by rays, which rays were in constant shooting motion, lengthening and shortening themselves incessantly, and presenting, as she said, a singularly beautiful appearance. There was no resemblance to an ordinary fire; the colour of the light was nearly pure white, sometimes mixed with iridescent colours, the whole more like the light of the sun than that of a fire. The light was denser and brighter towards the middle of the edges of the ends of the magnet, than towards the corners, where the rays formed bundles, longer than the rest. I showed the patient a small electric spark; this, she said, was more blue, and left on the eye a painful and lasting sensation like that caused by looking at the sun, when the image of the sun is afterwards seen on every object.

The experiment was more than once repeated with the same results; also with a weaker magnet, nothing being said of this to the patient, who saw this time only two luminous threads, no doubt the edges of the poles. The first magnet being now substituted for the other, she again saw the phenomena first described. Some time later, when the cure of the patient was far advanced, even the stronger magnet give rise to less distinct luminous appearances; after another interval, the patient saw with this magnet only the two luminous threads, and at last she saw nothing more, except a kind of flash when the armature was removed. Her rapid recovery put an end to further experiments with her, but from the character and circumstances of the patient, there was every reason to confide in her statements.

"6. The next case was that of Mlle. Maix, aged 25, daughter of a house steward in one of the imperial castles, to whom the author was introduced by Dr von Eisenstein. She had paralysis of the lower extremities, with occasional spasms. She was neither somnambulist, nor lunatic, nor a speaker in her sleep; she was not subject to any affection of the temper or spirits, and was a lady of clear intellect and sound understanding.

"As often as the armature was removed from a large magnet in the dark, she instantly saw the luminous appearance above the poles, about a handbreadth in height. But when affected with spasms, she was more sensitive, and the phenomenon increased in her eyes amazingly. She not only now saw the magnetic light at the poles much larger than before, but she also perceived currents of light proceeding from the whole external surface of the magnet, weaker than at the poles, but leaving in her eyes a dazzling impression, which did not for a long time disappear. We shall soon see how are all these things related together. This was the fourth confirmation of the existence of the magnetic light. Dr von Eisenstein had collected several more among his patients; but the author has not dwelt on them, because he soon saw that from all quarters there might be obtained abundance of confirmation, if it were only looked for. But he had yet to become acquainted with the most remarkable and most distinct observer.

"7. This was Mlle. Barbara Reichel, aged 29, of stout build, daughter of a servant in the imperial castle at Laxenburg. At the age of 7, she had fallen out of a window two stories high, and since that time she had suffered nervous attacks, passing partly into lunacy, partly into somnambulism, and speaking in her sleep. Her disease was intermitting, often with very long intervals, of health. At this time she had just passed through severe spasmodic attacks, and retained the entire sensitiveness of her vision, the acuteness of which was singularly exalted during her attacks. She was at the same time in full vigour, perfectly conscious, looked well externally, and went alone through the crowded streets of Vienna to visit her relations in their houses. The author invited her to his house, and she came as often as he wished it, so that he was enabled to employ her extraordinary sensitiveness to the magnetic influence in researches with such apparatus as could not conveniently be brought into other houses.

"This person, although strong and healthy, saw the magnetic light as strongly as any sick individual; she could move about freely, and was very intelligent; and in addition to these rare advantages, although highly sensitive, she could bear the approach of magnets, and experimenting with them, far better than sensitive persons generally do. It has already been stated that Mlle. Sturmann, for example, could not endure the approach of an open magnet without insensibility and convulsions being brought on. Such a rare case as that of Mlle. Reichel was invaluable for the purposes of science; and in fact by means of Mlle. Reichel, the author has obtained most precise and valuable results in reference to the theory of electromagnetism. In the present paper, however, he only brings forward those observations which bear on the luminous emanations from the magnet.

"Mlle. Reichel saw the magnetic light, not only in the dark, but also in such a twilight as permitted the author to distinguish objects, and to arrange and alter the experiments. The more intense the darkness, the brighter and larger she saw the flaming emanations, the more sharp and defined was their outline, and the more distinct the play of colours.

"8. When a magnet was laid before her in the dark, she saw it giving out light, not only when open, but also when the poles were joined by the armature. This may appear strange at first, but we shall see that this statement of Mlle. Reichel entirely corresponds with the essential nature of the phenomena. The luminous appearance was different in the two cases. With the closed magnets, there were no points where the light appeared concentrated, as was the case when the magnet was open: but all the edges, joinings, and corners of the magnet gave out short flame-like lights, uniform in size, and in a constant undulatory motion. In the case of the magnet of 9 elements, capable of carrying 80 lb., these were about as long as the thickness of a little finger.

"9. But when the armature was removed, it presented the beautiful appearance, fig. 1. This was drawn by Mlle. Reichel, to the best of her ability, but she regretted her inability to represent nature with perfect fidelity. Each arm of the magnet was about 8½ inches long, and the light rose almost to an equal height above the magnet, being rather broader than the bar. At each depression, where two plates of the magnet are laid together, there appeared smaller flames ending in points like sparks, on the edges and corners. These small flames appeared blue, the chief light was white below, yellow higher up, then red, and green at top. It was not motionless, but flickered, undulated, or contracted by starts, continually, with an appearance as of rays shooting forth. But here, as in the case of Mlle. Nowotny, there was no appearance of mutual attraction, or mutual tendency towards each other of the flames, or from one pole to the other; and as in that case both poles presented the same appearance. Fig. 2 gives a side view, in which each separate edge gives out its bundle of light. For the sake of distinctness, this was omitted in fig. 1, which was represented as a simple, not a compound magnet. In fig. 2, however, may be seen a little repulsion of like sides of the magnetic flames. Along the back and the inner, or concave side of the magnet, weaker lights everywhere appear, as already observed in part by Mlle. Maix. On the inside they are all directed upwards, on the outside only for a little distance upwards, then for a space horizontally outwards, and, lastly, they are turned downwards. These weaker lights are very delicate, and also motionless. They are represented in fig. 10, as occurring in a magnet of one bar. In the compound magnet along the joinings of the bars, the flames from the adjacent edges of two adjacent bars diverge at their origin, and, consequently, converge towards the remaining flames from the opposite edges of the same bars, causing the appearance seen in fig. 3.

"12. The author now took an electro-dynamic apparatus, partly for the purpose of forming an electro-magnet under the eyes of Mlle. R., partly in order to study the action which such a magnet and a common steel-magnet might have on each other, in reference to the luminous appearances. The steel-magnet consisted of a horse-shoe bar, the limbs widely separated, between the poles of which a horizontal electro-magnetic coil, protected by silk, could be made to rotate. The steel-magnet itself, the poles of which were directed upwards, had limbs of half an inch square. In the dark it exhibited appearances very similar to those of the large horse-shoe magnet first described: namely, at the four corners of each pole obliquely ascending flames, with a tendency to rotatory motion about themselves, and in the middle, a longer perpendicular flame, not, as in the former magnet, the broadest part, but like a long thin needle, a difference probably depending on the size and power of the magnets. Possibly it may have been caused by two small hollows made near the ends for the purpose of rotation. In this form the luminous appearance was stationary, and almost exactly alike at both poles. As soon as the electricity of a Grove's pair was made to pass through the protected coil of thick copper-wire, within which the iron-bar of the electro-magnet was placed, this bar shot forth rays of fire at both ends, and instantly exhibited all the luminous appearances of a magnet. Nay, more, after the current was stopped, the bar continued for some time to give out light at the poles with little change. (The origin and explanation of this last result is given in a subsequent section.) Consequently, an electro-magnet, in its radiation of flaming light, as visible to a sensitive person, entirely agrees with an ordinary steel-magnet.

"13. But the action of the two flames on each other was very remarkable. The flame of the steel-bar magnet gave way or yielded uniformly to that of the electro-magnet, as decidedly as the flame of a taper yields to the blast of the blowpipe. The figures 5, 6, 7, 8, and 9 exhibit the results. It remains to be ascertained whether they are due to the different power of the magnets or to other causes.

"Mlle. Reichel was therefore the fifth, and at the same time the clearest witness for the luminous appearances at the poles of magnets. The sixth was Mlle. Maria Atzmannsdörfer, aged 20, who had headach and spasms, and walked in her sleep. She looked well and walked alone in the streets. She was highly sensitive, and saw the magnetic poles flaming vividly. She drew the appearance as larger than Mlle. R., but in all other respects her description was the same. The light dazzled her eyes by its brilliancy.

"14. The following were the general results obtained with the horse-shoe magnet of 9 elements, in regard to the magnetic light.

"*a.* Mlle. Nowotny, far advanced in her recovery, saw a kind of shining vapour, surrounded by and mixed with rays one-half to three quarters of an inch long, shining, fitful, or shooting, white, with a play of colours.

"*b.* Mlle. Maix, in the normal state, saw a white flame a hand-breadth in height.

"*c.* Mlle. Sturmann, a flame as high as the length of a small hand, with play of colours.

"*d.* The lad, a flame a hand high.

"*e.* Mlle. Maix, while in a spasmodic condition, saw a general luminous appearance over the whole magnet, dazzling her eyes, largest and brightest at the poles.

"*f.* Mlle. Reichel saw a flame with play of colours, shooting out rays, as large as the magnet, that is, about ten inches high; also side flames from each plate of the magnet, and a general weaker light over the whole surface at the junctions of the plates.

"*g.* Lastly, Mlle. Atzmannsdörfer saw the same phenomena still more distinct, and so brilliant as to affect the eyes painfully.

"15. From the above facts it appears that the foregoing six sensitive individuals, each according to the degree of sensitiveness or to the diseased state of the body, saw, more or less vividly, a luminous appearance, like a moving flame, at the poles of powerful magnets. These individuals were highly sensitive, although of unequal sensitiveness, and, although unacquainted with each other, and with each other's observations, their accounts agree in all essential points, and were, in each case, uniformly consistent, not only with themselves, but with the known laws of electricity and magnetism. The author, having no reason to doubt the perfect honesty of these persons, and feeling at all events confident of his own caution, accuracy, and *bona fides*, has no hesitation in admitting the reality of the phenomena, although invisible to ordinary men; and he considers the fact of the existence of such luminous appearances at the poles of powerful magnets as fully established as the researches of one man can establish a fact. He confidently anticipates conformation from other observers, since sensitive persons, although not numerous, or readily found in small towns, are quite easily obtained in large cities."—Pp. 7–9.

"20. The *magnetic flame* is to be distinguished from the *magnetic light*. The former is flickering, and does not radiate: the latter radiates strongly. The flame yields like other flames when blown on, and when solid bodies are introduced into it. It would therefore appear that the *light* is distinct, imponderable; but that the flame is probably compound, consisting of a material substratum along with the imponderable light. Mlle. Reichel saw the light radiate from the magnet to the distance of 19 inches on the table." P. 11.

"The adhesion of a living limb to a magnet is a fact unknown in physiology as in physics, and few have seen it; it therefore requires explanation. Mlle. N. being in catalepsy, insensible and motionless, but free from spasms, a horse-shoe magnet of 20 lb. power was brought near to her hand, when the hand attached itself so to the magnet, that whichever way the magnet was moved, the hand followed it as if it had been a bit of iron adhering to it. She remained insensible; but the attraction was so powerful, that when the magnet was removed, in the direction of the feet, further than the arm could reach, she, still insensible, raised herself in bed, and with the hand followed the magnet as far as she possibly could, so that it looked as if she had been seized by the hand, and that member dragged towards the feet. If the magnet was still further removed, she let it go unwillingly, but remained fixed in her actual position. This was daily seen by the author between 6 and 8 P. M., when her attacks came on, in the presence of 8 or 10 persons, medical and scientific men.

"At other periods of the day, when she was quite conscious, the phenomena were the same. She described the sensation as an irresistible attraction, which she felt compelled, against her will, to obey. The sensation was agreeable, accompanied with a gentle cooling aura, streaming or flowing down from the magnet to the hand, which felt as if tied and drawn with a thousand fine threads to the magnet. She was not acquainted with any similar sensation in ordinary life; it was indescribable, and included an infinitely refreshing and pleasurable sensation, when the magnet was not too strong.

"The author being at first much surprised at these results, and indeed incredulous, tested the accuracy of these experiments, and the veracity of Mlle. N. in every possible way. Among other trials, he found that when a large open magnet was brought near her bed-head, without her knowledge, on the opposite side of the wall, she instantly detected the vicinity of an open magnet. The armature being attached, she became quiet, and so on any number of times. Again, M. Baumgartner, the distinguished natural philosopher, one day tried on her a magnet which, he said, was the most powerful he had, and requested her opinion on it. She declared that it appeared to her very weak indeed, in fact it had almost no action at all. M. B. then stated that it had been, in reality, a very powerful magnet, but that he had destroyed its power by drawing a magnet the contrary way along it before he brought it out. No one present knew of his intention. Many such tests were applied, but invariably proved the perfect integrity of the lady,

"Similar results were obtained with Mlle. Reichel and Mlle. Sturmann; and they all established the fact, that, in certain diseases, especially catalepsy, an attraction exists between the hand and a magnet. In the case of Mlle. N. a certain amount of this attraction was observed also in the foot, but far weaker; and in no other part of the body has the author observed it.

"24. The next question was, is the attraction mutual? or will the hand attract bodies that are attracted by the magnet? Experiment showed, that the hand of the cataleptic patient had no attraction for iron filings, did not in the least affect the needle, and exerted no appreciable attraction on a magnet which was counterpoised on the beam of a balance, and brought near to the hand, although it required some force to prevent the hand from rising to the magnet. That is to say, while the magnet attracted the hand vitally, as may be said, the hand did not attract the magnet statically, but the beam remained strictly horizontal."—Pp. 12—14.

"28. The author was still more surprised to find that not only the magnet, but a magnetised glass of water, possessed the property of attracting the hand of Mlle. Nowotny. This took place in an inferior degree, but the hand never failed to show a tendency to follow the magnetised water, whether the patient were in a state of catalepsy or not.

29. Being convinced that such a phenomenon could not be an isolated one, the author tried, whether the same effect might not be produced by other bodies besides water, hoping, if this were so, to be enabled to trace some general laws. All sorts of minerals, preparations, drugs, in short, objects of all kinds were therefore magnetised in the same way as the water, by drawing or passing the magnet along them, and tried on the patient; and all of them had acted as the water had done, more or less powerfully. Some of them caused spasms over the whole body, others only in the arm, others again only in the hand, and, lastly, others not at all, although all were equally magnetised. It was clear that a difference existed in the different kinds of matter, which here came into operation.

"30. To investigate this, the same substances were tried, without being previously magnetised, in their natural condition. To his astonishment they still acted on the patient, and that with a power often little inferior to that which they had when magnetised. They did not, however, always give to the hand a tendency to follow, but more frequently caused it, as described in § 25, to grasp the magnet convulsively, with various degrees of force."—P. 15.

"The general result is, that distinct solitary crystals acted on the hand very distinctly, as described ; and therefore *such crystals appeared to possess a power not previously noticed, and of a peculiar nature.* As far as we have gone, this property appears to depend on the structure of matter, and particularly its state of aggregation." —P. 17.

"35. The author found among his friends several individuals sensitive to crystals, and is allowed to name M. Carl Schuh, and Dr Endlicher, both men of science, and in good health. About one-half of those in the author's neighbourhood have been found more or less sensitive. Many, with averted faces, could tell whether the streak were made with the positive or negative pole of the crystal.

"36. The crystals should be large, single, with natural acuminations ; heavy spar, fluor spar, gypsum, and rock crystal, are the best. They must be drawn as near the inner surface of the hand as possible, 5 seconds being taken to a streak, and held perpendicularly. The author describes minutely the precautions observed, and the occasional contradictions naturally occurring in regard to a sensation so feeble as this must be. It appears that individuals are often more or less sensitive at one time than at another. The power of distinguishing the sensations appears to be increased by practice. The upward streak and the south pole seem to be the most efficacious in many persons.

"37. The question now arose ; is the force existing in crystals the same as magnetism ? If so, it ought to attract iron, and to communicate to steel the power of attracting iron. But the author could not detect the smallest trace of this magnetic power, even with a rock-crystal of 8 inches diameter, which caused, in the case of M. Schuh, a very strong aura."—P. 19.

"The conclusion seems unavoidable, that all crystals, like the magnet, give forth a flaming light at their poles, not usually visible to the healthy eye, but visible to the eyes of persons suffering from certain nervous diseases, in whom all the senses are generally much more acute.

"The light given out by many bodies during crystallization seems to connect itself with this subject. For it has been proved by H. Rose, that that light is not connected with the evolution either of heat or of electricity ; and it becomes, therefore, highly probable, that during the rapid combination into crystals of the molecules previously dissolved, circumstances occur, in which the crystalline light becomes so far concentrated as to be visible to the ordinary eye."—P.26.

"56. From what has been said, it appears that the peculiar force thus detected, opens up a new leaf in the book of the imponderables. The new force appears to be subject to the general laws of imponderables, but has its specialities and peculiar laws, the study of which must henceforth be a problem of physics. It is exceedingly desirable to discover an inorganic test or re-agent for it, a means of recognizing and measuring it, which shall relieve us from the dependence, often more than disagreeable, on sick persons, hospitals, and unscientific people of all kinds.—P. 26.

" *Terrestrial Magnetism.*—62. M. Schmidt had experienced, in travelling, a chill in the right arm, and had suffered for some time from violent rheumatism, with most painful cramps, from the shoulder to the fingers. He was treated by his physician with a magnet, which relieved the cramps, although they always returned. He lay then with his head to the south, on the position being reversed, so that he lay in the magnetic meridian, with his head to the north, he immediately felt comfort and relief. Instead of shiverings, he now felt an agreeable uniform warmth, the passes with the magnet were now much more cooling and beneficial than before; and before the author left him, the stiffened arm and fingers were quite movable, and the pain had disappeared.

" 63. On examining the position of Mlle. Nowotny, she was found lying almost exactly on the magnetic meridian, her head towards the north. She had instinctively chosen this direction, and it had been necessary to take down a stove to allow her bed to be placed as she desired it to be. She was requested, as an experiment, to lie down with her head to the south. It took several days to persuade her to do so, and she only consented in consideration of the weight which the author attached to the experiment. At last, one morning he found her in the desired position, which she had assumed very shortly before. She very soon began to complain of discomfort, she became restless, flushed, her pulse became more frequent and fuller, a rush of blood to the head increased the headach, and the sensation of nausea soon attacked the stomach. The bed with the patient was now turned, but was stopped half way, when she lay in a magnetic parallel, with the head to the west. This position was far more disagreeable than the former, indeed, absolutely intolerable. This was at half-past 11 A. M. She felt as if she would soon faint, and begged to be removed out of this position. This was done, and as soon as she was restored to the original position, with the head to the north, all disagreeable sensations diminished, and in a few minutes were so completely gone, that she was again cheerful. But besides these very disagreeable feelings which acted profoundly on her, in the altered position, all her sensations, in regard to external matters, were altered. For example, the streaking with a magnet, usually so agreeable, was now disagreeable; and if strong, intolerable; and in short, all her relations to different substances took a new and very different form.

" All these experiments were at different times repeated, and with exactly the same results. She could hardly endure the position from west to east, or that from east to west, more than a minute, without feeling all the symptoms above described, with a tendency to syncope, and recovered instantly when the position was changed to that of north to south.

"As she had long been affected with a gradually increasing illness, the author enquired if at any former period this sensibility to position had occurred, and it appeared that she had lived in different houses, and had suffered uneasiness in some, while in others she had felt comfortable, without the cause being known. Her brother was now told to take a compass and ascertain the position of her beds in the different houses, as well as of her couches and work-chairs. It was found that in one house her bed and couch had accidentally been almost exactly in the magnetic meridian, and that she had lain with her head towards north, not towards south. In another house she had lain in a line north-east and south west. In fact she had been comfortable in the former, while in the latter she had always suffered and struggled with illness. Even now, without knowing why, she could not bear to sit across her bed or sofa, neither could she lie on the sofa, but could only bear to lie in bed. In the first case her position was from west to east, in the second east to west, in the third south to north; only in the last could she obtain the indispensable position from north to south.

"Of all positions, the worst by far was that from west to east, that is, the head to the west."—Pp. 29–30.

"71. If now terrestrial magnetism appears to be so powerful an agent on our bodily condition, that, in the above cases, it in a great measure decided the question of healthy and morbid feelings, we are entitled, nay compelled, to conclude that in most, perhaps all similar sensitive cases, it will be impossible to produce any curative effect by the magnet, as long as the patient is not placed in a proper position with reference to the earth's magnetism; and that this point must be above all others attended to in all magnetic treatment. We must also conclude, that all magnetic phenomena in persons affected with nervous maladies, and probably also in those affected with other diseases, are essentially influenced by this cause. These observations likewise furnish a key to many of the numerous errors and contradictions which have occurred in animal magnetism, from the time of Theophrastus and Mesmer to our own day, which have confounded the clearest heads, and have introduced everywhere contradiction in the facts and discord in the opinions. For if the same disease were treated magnetically in Vienna in the position north to south; in Berlin in that of east to west; and in Stuttgart in that of south to north, totally different results would be obtained in the three cases; and no agreement in the experience of the different physicians could be obtained. Nay, if the same physician, at different times, or even at the same time in different places, were to treat the same disease with the same magnetic means, while accidentally the beds of his patients were placed in different positions, he must necessarily see quite different results, so as to be entirely puzzled with magnetism and with himself. He must conclude it to be full of caprice and change; and finding it impossible to foresee and regulate its action, reject magnetism altogether as an unmanageable instrument. Such has been in fact, the sad history of magnetism. From the earliest times, often taken up, and as often cast aside, it now lies, almost unemployed, and yet is so distinguished, so penetrating, nay, we may say, so incomparable a means of relief in cases where man has hitherto been unable to afford any benefit. Nervous diseases are still the *scandala medicorum.* It may be confidently expected that ere long an improvement will be effected. The all-powerful influence of terrestrial magnetism will be measured and calculated, and the whole subject of magnetism will now admit of being regularly studied in reference to medicine. Progress will be made; experimenters will mutually understand each other; and the world may at length hope to derive some actual benefit from those extraordinary things, which have so long excited expectation without satisfying it. Having thus established the existence of a powerful influence exerted by the earth's magnetism on the magnetic phenomena in sensitive persons, all subsequent magnetic experiments were made with the patients in the position from north to south, which is considered by the author as the normal position for the living body, sensitive or affected with nervous maladies."—Pp. 32–33.

"We have seen—§ 78. That the hand, passed over sensitive patients, acts on them like the poles of crystals.

"§ 79. That the power which here acts is conductible through all bodies like the force of crystals.

"§ 80. It is capable of being collected in other bodies, like the force of crystals.

"§ 81. That it disappears from the bodies thus charged in a short time, like the force of crystals.

"§ 82. That bodies can retain it, or have a coercitive power in reference to, as in reference to the force of crystals.

"§ 82. That the capacity of being charged is the same for both forces in all bodies.

"§ 88. That this force is polarised in the human body as the other is in crystals.

"§ 89. That both are alike uninfluenced by the earth's magnetism.

"§ 90. That this force exercises a mechanical attraction on the hands of cataleptics, as does the force of crystals.

"§ 92. That this force exhibits beautiful luminous phenomena, visible to the sensitive, of the same kind and strength as those exhibited by the force of crystals.

"And then we are brought back to the proposition of § 78, namely, that the same force exists in the human hand, which is found in crystals: that, consequently, the force of crystals and the so-called animal magnetism are absolutely one and the same; and, therefore, the laws which regulate the former, admit of being fully applied to the latter."—P. 43.

"129. The same experiments, made with Mlle. Reichel, gave the same results, both with a copper plate and one of zinc; the latter causing a weaker current of force. Both gave a flame at the end of the wire, visible to Mlle. R. in the dark. The author sawed through a bar of wood with a fine saw in her presence in the dark. She saw nothing peculiar about the saw-dust, but the blade of the saw, where used, soon appeared as if red-hot, while each tooth gave out a flame. Copper and zinc plates, rubbed together in the hands, showed only here and there a spark. Zinc rubbed on zinc, and copper on copper, gave likewise slight flashes of light. Gypsum, rubbed on gypsum, gave no light. Masses of charcoal rubbed together appeared, on the rubbing surfaces, red-hot to the depth of a finger-breadth. Sugar with sugar gave the usual light visible to all, but Mlle. R. saw this enveloped in a flame one inch and a half high. When two glass bottles were rubbed together in the dark, the author himself saw them become fiery at their point of contact: but Mlle. R. saw the points of contact enveloped in flames as large as the fist. Unglazed porcelain crucibles, when rubbed together, gave a brilliant light visible to the author; the patient saw, in this case, flames as large as the open hand. At this time she was so well as to be able to walk daily without difficulty through the streets of Vienna."—P. 57.

"137. For about 70 years, an instrument has been employed by some physicians, under the name of the magnetic baquet or tub: the description of which would cause any one accustomed to a scientific method of proceeding to shudder with disgust. A wooden tub is filled with a hotchpotch of the most absurd kind, and this is stirred up with magnetised water. An iron rod is stuck in the mixture, and from this woollen threads serve as conductors to patients of all kinds, who are to receive from it a current of salutary vital magnetism. This mixture consists of iron-slag, broken glass, smithy-scales or ashes, steel-filings, roots, iron-ore, grain, sulphur, sawdust, glass-plates, wool, old iron, aromatic herbs, quicksilver, &c., all magnetised and mystically stratified, the one above the other. What salutary influence, it may well be asked, can proceed from this hell-broth? But how such a mess can produce, above all, a magnetising influence, no one can comprehend, and yet (on this point all who occupy themselves with magnetism as a means of cure are unanimous) it is said to be a continued and permanent source of magnetism, capable of being communicated to the sick by the conducting-threads.

"138. That this apparatus cannot be either a galvanic or an electric one, and far less a magnetic one, is obvious to all who know the rudiments of these things; and yet it has an effect, observed for 70 years, in some points analogous to the effects of these powers; and at the root of which must lie something concealed, no matter what, which has a real existence, or the baquet could never have prolonged its existence, as a curative agent till this day. On reflection, it appeared to the author, that only one thing was obvious in regard to the baquet, namely, that it must be a scene of chemical action. Free scope was given to all the affinities of the substances employed, and combinations and decompositions must go on slowly in it at all times. Since, according to the physicians, an influence did proceed from it, analogous to that which he had already traced to eight different sources, he was led to enquire, whether chemical action, by itself, was capable of producing and exciting the same influence; whether, in short, chemical attraction might not be a new source of the force so often mentioned."—Pp. 60–61.

"153. Let us now cast a glance back to the magnetic baquet: this strange contrivance now loses its enigmatic character, no doubt, at the cost of becoming more ridiculous. It is nothing but an accidentally thrown together slow and long continued source of chemical action; from which flows the desired force, just as a slow fire gives out heat. It is a slow current, derived from chemical action, of the influence residing in magnets, in crystals, in the human hand, &c., and in this case is called Animal Magnetism. Now, we see why the baquet, when stirred up after a long interval, when it has become dull, again acquires new vigour; because new surfaces for solution are produced; also, why every new physician makes his own hotchpotch, and yet obtains the same results; because it is indifferent what substances are present, provided they can act chemically on each other; and, finally, how one, who used a baquet of water and glass obtained little, and others who followed him, obtained no results: because glass and water, although a magnetic incantation may have been pronounced over them, do not act together. The whole scaffolding of the baquet, which, since the time of Mesmer, has not a little contributed to render animal magnetism ridiculous, will now fall to pieces; and any slow chemical action (perhaps an open voltaic circuit may prove the best), manageable as to power, and convenient in form and size, will replace it."—P. 65.

"158. The author closes this section with a useful application of the results, which is, says he, so much the more welcome, as it utterly eradicates one of the chief foundations of superstition, that worst enemy to the development of human enlightenment and liberty. A singular occurrence, which took place at Colmar, in the garden of the poet Pfeffel, has been made generally known by various writings. The following are the essential facts. The poet, being blind, had employed a young clergyman, of the evangelical church, as amanuensis. Pfeffel when he walked out, was supported and led by this young man, whose name was Billing. As they walked in the garden, at some distance from the town, Pfeffel observed, that, as often as they passed over a particular spot, the arm of Billing trembled, and he betrayed uneasiness. On being asked, the young man reluctantly confessed that, as often as he passed over that spot, certain feelings attacked him, which he could not control, and which he knew well, as he always experienced the same, in passing over any place where human corpses lay buried. He added, that, at night, when he came near such places, he saw supernatural appearances. Pfeffel, with the view of curing the youth of what he looked on as a fancy, went that night with him to the garden. As they approached the spot in the dark, Billing perceived a feeble light, and when still nearer, he saw a luminous ghost-like form floating over the spot. This he described as a female form, with one arm laid across the body, the other hanging down, floating in the upright posture, but tranquil, the feet only a hand-breadth or two above the soil. Pfeffel went alone, as the young man declined to follow him, up to the place where the figure was said to be, and struck about in all directions with his stick, besides running through the place of the figure; but the ghost was not more affected than a flame would have been: the luminous form, according to Billing, always returned to its original position after these experiments. Many things were tried during several months, and numerous companies of people were brought to the spot, but the matter remained the same, and the ghost seer adhered to his serious assertion, and to the opinion founded on it, that some individual lay buried there. At last, Pfeffel had the place dug up. At a considerable depth was found a firm layer of white lime, of the length and breadth of a grave, of considerable thickness, and when this had been broken into, there were found the bones of a human being. It was evident that some one had been buried in the place, and covered with a thick layer of lime (quicklime), as is generally done in times of pestilence, of earthquakes, and other similar events. The bones were removed, the pit filled up, the lime mixed and scattered abroad, and the surface again made smooth. When Billing was now brought back to the place, the phenomena did not return, and the nocturnal spirit had for ever disappeared.

"159. It is hardly necessary to point out to the reader what view the author takes of this story, which excited much attention in Germany, because it came from the most truthful man alive, and theologians and psychologists gave to it sundry terrific meanings. It obviously falls into the province of chemical action, and thus meets with a simple and clear explanation from natural and physical causes. A corpse is a field for abundant chemical changes, decompositions, fermentation, putrefaction, gasification, and general play of affinities. A stratum of quicklime, in a narrow pit, unites its powerful affinities to those of the organic matters, and gives rise to a long continued working of the whole. Rain-water filters through and contributes to the action; the lime on the outside of the mass first falls to a fine powder, and afterwards, with more water, forms lumps which are very slowly penetrated by the air. Slaked lime prepared for building, but not used, on account of some cause connected with a warlike state of society some centuries since, has been found in subterraneous holes or pits, in the ruins of old castles; and the mass, except on the outside, was so unaltered that it has been used for modern buildings. It is evident, therefore, that in such circumstances there must be a very slow and long continued chemical action, partly owing to the slow penetration of the mass of lime by the external carbonic acid, partly to the changes going on in the remains of animal matter, at all events as long as any is left. In the above case, this must have gone in Pfeffel's garden, and as we know that chemical action is invariably associated with light, visible to the sensitive, this must have been the origin of the luminous appearance, which again must have continued until the mutual affinities of the organic remains, the lime, the air, and water had finally come to a state of chemical rest or equilibrium. As soon, therefore, as a sensitive person, although otherwise quite healthy, came that way, and entered within the sphere of the force in action, he must feel, by day, like Mlle. Maix, the sensations so often described, and see by night, like Mlle. Reichel, the luminous appearance. Ignorance, fear, and superstition, would now dress up the feebly shining vaporous light into a human form, and furnish it with human limbs and members; just as we can at pleasure fancy every cloud in the sky to represent a man or a demon.

"160. The wish to strike a fatal blow at the monster of superstition, which, at no distant period, poured out on European society from a similar source, such inexpressible misery, when, in trials for witchcraft not hundreds, not thousands, but hundreds of thousands of innocent human beings perished miserably, either on the scaffold, at the stake, or by the effects of torture,—this desire induced the author to try the experiment of bringing, if possible, a highly sensitive patient, by night, to a churchyard. It appeared possible that such a person might see, over graves, in which mouldering bodies lie, something similar to that which Billing had seen. Mlle. Reichel had the courage, rare in her sex, to gratify this wish of the author. On two very dark nights she allowed herself to be taken from the castle of Reisenberg, where she was living, with the author's family, to the neighbouring churchyard of Grunzing. The result justified his anticipation in the most beautiful manner. She very soon saw a light, and observed on one of the graves, along its length, a delicate breathing flame; she also saw the same thing, only weaker, on a second grave. But she saw neither witches nor ghosts; she described the fiery appearance as a shining vapour, one to two spans high, extending as far as the grave, and floating near its surface. Some time afterwards she was taken to two large cemeteries near Vienna, where several burials occur daily, and graves lie about by thousands. Here she saw numerous graves provided with similar lights. Wherever she looked she saw luminous masses scattered about. But this appearance was most vivid over the newest graves, while in the oldest it could not be perceived. She described the appearance less as a clear flame, than as a dense vaporous mass of fire, intermediate between fog and flame. On many graves the flame was four feet high, so that when she stood on them, it surrounded her up to the neck. If she thrust her hand into it, it was like putting it into a dense fiery cloud. She betrayed no uneasiness, because she had all her life been accustomed to such emanations, and had seen the same, in the author's experiments, often produced by natural causes. Many ghost stories will now find their natural explanation. We can also see, that it was not altogether erroneous when old women declared that all had not the gift to see the departed wandering about their graves; for it must have always been the sensitive alone who were able to perceive the light given out by the chemical action going on in the corpse. The author has thus, he hopes, succeeded in tearing down one of the most impenetrable barriers erected by dark ignorance and superstitious folly against the progress of natural truth."—Pp. 67—70.

"196. The castle of Reisenberg, the residence of the author, where these experiments were made, is so built that, in the chief front, two suites of nine rooms each are connected by folding doors, all in one line. Each line is 144 feet long, with a balcony at each end, 9 feet broad; in all, therefore, the author could command a straight line of 162 feet in still air. When working with wires, the distance can be doubled by adding the one suite to the other, thus commanding nearly 330 feet. Mlle. R. was placed at one end, and experiments were made on the distance to which the effects of substances would reach. To obtain a measure, magnets were first tried. With a small horse-shoe magnet, the limbs of which were two and a half inches long, it was necessary to go to seven and a half feet from the patient before the effect disappeared. With another, the limbs of which were seven inches long and two broad, it was necessary to go as far as 54 feet. A heavy horse-shoe magnet, of nine elements, and carrying at that time 40 lb., only ceased to act at 90 feet, or at the further end of six rooms. Experiments with a bar-magnet of about one and a half foot long, gave, for the distance at which the patient ceased to perceive the effect, for the south or positive pole, about 69 feet, and for the north or negative pole, about 54 feet.

"197 The iron bars which had been used to form a parallelogram, as the armature to the last named magnet, of which one was exactly equal in size to the magnet, the others only one-fifth of its length, were tried separately. They attracted no iron-filings, and were quite unmagnetic in regard to the needle; but the patient felt them at the following distances:

| | | |
|---|---|---|
| One end of the long bar | at | 69 feet. |
| The other end . | ... | 60 ... |
| Of the two cross bars: | | |
| One end . . | ... | 24 ... |
| Both together . . | ... | 45 ... |
| The other end . . | ... | 33 ... |
| Both together . . | ... | 63 ... |

"Thus the pieces of the armature alone acted on the patient as stronly as the magnet itself; and must, therefore, in regard to the crystalline force, have come into equilibium with it. In this very remarkable result, deception is out of the question, because it was quite impossible for the patient, several rooms off, to know the precise position of the bars, and all her observations were perfectly consistent among themselves, and thus mutually controlled each other.

"198. Three days later, menstruation having come on, her sensitiveness was much increased, and she felt the large magnet of 9 elements at the entire distance of 162 feet so strongly, that she thought it would still be perceptible at twice the distance. The surface (half a square foot) of sulphur was now tried and found to produce the cool aura sensibly at 108 feet. A plate of copper, of more than 4 square feet surface, was tried, and produced heat at 84 feet. An iron plate, of 6 square feet, produced warmth at 132 feet; lead-foil, 6 square feet, at 67 feet; tinfoil, 6 square feet, at 63 feet; zinc plate, 6 square feet, at 60 feet; silver paper (pure), 1 square foot, at 21 feet; gold paper (pure), 3 square feet at 60 feet; an electrophorous plate (of wax or resin) 14 inches diameter, at 90 feet; a mirror, of 9 square feet, at 96 feet; and a small bottle of oxygen gas at 15 or 16 feet.

"Many other objects, of brass, porcelain, glass, stone, paper, wood, linen, open or shut doors, trees, people, horses, dogs, cats, ponds of water, &c. &c. &c., especially if they had been shortly before exposed to the rays of the sun, in short every thing material acted on the patient, causing sometimes a cool, sometimes a warm current to flow towards her, and many of these so strongly as to attract her attention and annoy her severely; many, again, so feebly that she, being used to the thing, paid no attention to it."—Pp. 80–82.

"212. From the author's windows, which commanded a free prospect towards east and south, in a clear night, Mlle. Reichel perceived a distinct influence of the kind suspected. On a neighbouring hill, in a clear, calm, moonless night, she felt that some parts of the sky sent forth a current of coolness, others one of warmth. This was tried soon after sunset, then about 9 P. M., twice at midnight, once at 4 A. M., and just before sunrise. In general it appeared that soon after sunset the west, and before sunrise the east, were especially cool; at 9 P. M., north and north-west were the cooler, south and south-east the warmer; at 4 A. M., N. and N.E. were the cooler, S. and S.W. the warmer; and, finally, at midnight, N. was cool, S. warm, and W. and E. so nearly in equilibrium, that little difference was perceptible. They were probably quite equal at 2 or 3 A. M.

"213. These changes depend on the position of the sun, which we know causes coolness; for the greatest coolness was always found in the region nearest the sun, and the presence of clouds made no difference. When the patient was asked to point out exactly the middle of the north cool region and the south warm one, she always pointed in the magnetic meridian, never in the astronomical meridian. She declared that towards S. she felt a limited strip of the greatest warmth. Even at mid-day she found the line of the magnetic meridian the warmest towards the south, and the coolest towards north, of all points of the compass. This clearly indicates the theoretical value of these indications.

"214. But these phenomena, partly solar, partly terrestrial, are not to be confounded with those derived from the stars, with which they are mixed up. Mlle. Reichel always found the milky way cool; also the Pleiades, the Great Bear and other constellations; indeed the starry firmament in general. On the other hand, certain single stars gave her a sensation of warmth: these were, Saturn with his ring, Jupiter with his satellites, Venus; in short, planets alone. It thus appeared that stars shining with reflected light were warm; those giving out their own light cool."—Pp. 87–88.

"218. The author, having now established the existence of a force, or influence, distinct from all known forces, or at all events requiring to be investigated distinctly, finds it necessary to give it a name. That of Magnetism, which has long been given to it in some of its manifestations, although founded on analogy, conveys an erroneous impression; since it forms only a part of what is usually called magnetism, and is found, besides, unmixed, in crystals, and in other sources of it. It is no doubt highly probable that all the imponderables are either essentially modifications of one force, or closely connected together; but this is not yet demonstrated; and as long as, in reference to the force now under consideration, a bar of iron, incapable of attracting iron-filings, or of affecting the needle, can produce as powerful an effect as a magnet of the same size, so long must we consider these forces as distinct, and to avoid confusion they must have different names. For reasons not further specified, the author has given to the new imponderable the name of Od, a name not possessing any meaning, but admitting of being compounded, according to the genius of the German language. Thus he calls the force, abstractly, Od; as it is found in crystals, magnets, the living body, in heat, in light, &c., Crystallod, Magnetod, Biod, Thermod, Photod, &c. Although this may answer very well in German, it is not likely that these names will be adopted in this country."—Pp. 89.

"263. It appears that hunger diminishes the force in the right hand, while the taking of food increases it. Here we come to coincide with the effects of chemical action, as formerly described. The food enters at once into a state of chemical activity; digestion, that is, decomposition, begins, and currents of the new force arise. It matters not what share we ascribe to vitality in these phenomena; they are still decompositions, from which spring manifestations of the new force, extending over the whole system, and charging the limbs with it."—P. 104.

"The course of the influence in the head or brain is, in general, analogous to that of the hands; rising in the morning, falling slightly at midday, reaching its highest maximum in the evening, and the lowest minimum towards 4 A. M.: these points agree tolerably, and may probably represent the daily movement in the whole organism in a person leading the life of the author. The great difference between brain and hands lies in the fact that the brain participates far less in the effects of hunger and the taking of food. It is wisely ordained that when food fails, the energy of the mind which provides for its supply does not at once give way. Of the two sides, the right is sooner disposed for sleep, and sooner roused to action in the morning, and indeed exhibits generally more excitability, but not more strength, than the left.

"269. The forehead and occiput are anatomically more different than the two sides of the head. Two experiments were made, each of 24 hours, to compare them. The result is seen in fig. 7 (Plate II.) There appeared a marked opposition; the forehead being generally cold, the hindhead very warm, and these results were also obtained in animals, cats, horses, cows, &c. The human forehead, in regard to the energy of the influence, gave a curve, rising decidedly with the break of day, little affected by the hunger before breakfast or before dinner, and reaching its maximum after sunset. All this time the curve of the hindhead remains almost unaffected, so that at 6 P. M. it stands exactly where it had been at 6 A. M. But now just when the curve of the forehead begins to fall, it begins to rise; so that the two curves cross each other, the one falling and the other rising till about 3 A. M., when the curve of the forehead reaches its minimum, that of the hindhead its maximum. From this point they again pursue opposite courses, and while the latter quickly falls after 3 A. M., the former begins about 4 A. M. to rise nearly as rapidly.

"270. This curious relation is the image of our sleeping and waking, the former being represented by the occiput, the latter by the forehead. They are not only opposed in polarity, and in the sensations they cause to the sensitive, but in their activity and its periods, they are as distinctly opposed as day and night.

"271. In reference to the new force, therefore, the difference between sleeping and waking is not that between activity and rest, or between motion and repose; it is merely that the focus of activity is changed. The force does not cease nor diminish, but shifts its seat, and what it loses in intensity before, it recovers behind. Sleep thus appears, not as a depression of vital activity, but as a dislocation of it. In the same degree as during the day vitality was active in the forehead, did it predominate at night in the hindhead. Sleep is only to be compared to death in poetry, not in physiology. Vitality is just as active during sleep as in our waking hours, only in a different direction.

"272. A curious supplementary proof of this occurred, which is represented in fig. 4 (Plate II.) The author had, soon after dinner, become drowsy, anddozed for ten minutes in his chair. Before, during, and after this sleep, his right hand was tested by the patient. The result is seen between the hours of 4 and 5, where it is seen that the curve, instead of rising steadily as usual, made an anomalous leap downwards, and then again rose. This short slumber was enough to cause a very perceptible change in the distribution of the force, so that the amount in the hand fell, and only rose after he was fully awake, and the normal condition restored.

"273. The pit of the stomach is a point of the body which plays a peculiarly important part in somnambulists. As great obscurity prevails in regard to this matter, it was important to ascertain the relation of the new force to the pit of the stomach. An experiment, of 24 hourly observations, gave the result fig. 8 (Plate II.) The curve agrees generally with that of the hands, but it seems to be retarded, all the marked points occurring later. In this sense there is nothing remarkable in the pit of the stomach. But the author promises, in a future publication, to give accounts of some very remarkable effects produced on this part of the body by mental emotions, and reflected in the physical functions of life.

"274. A series of 24 hourly observations on the right hand of the author's daughter Herminia, see fig. 9 (Plate II.) yielded a curve so near that of his own hand, that it is evident there is no marked difference between the sexes in this respect."—Pp. 106–107.

The foregoing pages contain an account of facts which M. Reichenbach believes he has ascertained as the phenomena of magnetism, terrestrial magnetism, and the influence which they are supposed to exert on the human body. The following statements contain certain inferences as to applications to be made in explaining this supposed action on the human body.

"278. Many applications of these facts suggest themselves; but one appears of great practical value. If the day, with its supply of sunlight, and its rising energy of the new force in hands and forehead, is destined for the intellectual exertions of man, and the night with its darkness, its energies sinking in the forehead and rising in the occiput, rather for the unconscious vegetative functions, then everything in our habits which agrees with this arrangement must be favourable, and everything at variance with it unfavourable to our physical well-being. It is right, therefore, to eat by day, and not later than some hours before bedtime; because the taking of food and the daylight, both promote the development of the new force, and the chemical action of digestion lasts for some hours. Late eating is followed by broken sleep and dreams; because, while the food favours the activity of the forehead, night, in opposition to this, causes the energy of the hindhead to rise. In these circumstances, there must be an unpleasant struggle in the system. It was found that the nightly fall of the force in the hands and forehead took place in the author and his daughter exactly as much later than in Mlle. Reichel, as their dinner-hour was later than hers. He who will go late to bed, does well to eat proportionally late.

"279. But to do this is contrary to the natural course of animal life, and must be injurious to health. The sleep obtained about midnight, is the most sound and refreshing. This naturally follows from the fact, that sleep naturally comes on, at sun-set, at the time of the change in the direction of the new force, and continues till, with the sunshine, new force arises in the forehead. If we go late to bed, we must sleep till late in the morning; but in this case the natural current is against us, just as when we go to sleep with a full stomach. It is well known, that when we go late to bed and rise late, we are generally dull and out of spirits, compared with those who accommodate their habits to the arrangements of nature.

"He who would ensure the continuance of health by attending to the distribution of the force so often mentioned, the influence of which is so penetrating and universal, must rise at latest with the first rays of the sun, take his chief meal at from 11 A. M. to 12, never later than 1 P. M., eat little or nothing afterwards, and retire to rest at the evening twilight. All animals do this, and, indeed, so does the half savage in his condition, which is, in many points, a natural one. So also do many poor people and many persons of small means, especially in the country. It is only civilized man, as he is found in our cities, who does better; he sups at 10 or 11 at night, goes to bed at 2 or 3 in the morning, and then sends for the physician on account of gout, scrofula, or spleen."—Pp. 108–109.

We have already said, that though we think it right to make known the supposed discoveries of M. Reichenbach, we refrain from any opinion as to the question whether they are facts or not. It argues no undue degree of scepticism, to say that the statements require to be confirmed and corroborated by others. This is demanded equally by prudence and philosophy.

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## ART. V.—*Registration of the Causes of Death; Circulars to Medical Practitioners and to Registrars; A Statistical Nosology for the use of those who return the causes of death under 6 and 7 William IV. c. 86; Circular to Coroners, and a Classification of the Causes of Violent Deaths.* General Register Office, December 1845. London, 1845. 8vo. Pp. 80.

THE recent appearance of this tract, which contains a new edition of the statistical nosology originally issued by the Registrar-General, suggests the propriety of addressing at present a few words to the medical practitioners of Great Britain, on the subject of correct registration of the causes of death.

Nine years have now elapsed since by the act of registration passed in the 6th and 7th of William IV., the system of recording the causes of deaths through the various counties of England and Wales has been carried into effect. During that time the system has been worked with great diligence and regularity, first by Mr Lister, and latterly by the present Registrar-general, Mr George Graham. During that time six reports have issued from the office, besides weekly reports of the mortality of London, all bearing testimony both to the advantages of the system and its provisions, and to the indefatigable labour and great attention of those, by whom its details are collected and methodized. It is quite clear that the present Registrar-General devotes to the subject the energies of a powerful and very active mind; that he is incessant in his endeavours to insure the accuracy and regularity of the several returns; and that with such a head, if the medical practitioners perform their parts with fidelity and accuracy, the whole machine must perform its functions in a satisfactory and proper manner.

As, however, a very large proportion of the success of such a system must and does depend on the care with which medical practitioners ascertain and report the causes of death; and as we fear, that they are not sufficiently impressed with the importance of this fact, we trust that they will listen patiently, while we give them some information, and bestow on them a little advice.

First, then, we have to direct their attention to the fact, that medical knowledge, though reasonably accurate, and medical practice though more successful than heretofore, are nevertheless in such a position at present, that the principal if not the sole prospect of improving either, must depend very much on the improvement of our statistics. One of the most important branches of medical knowledge is to understand the causes of disease and their mode of operation, to be well acquainted with those diseases which are most prevalent, and those which are most fatal, to understand the causes and origin of epidemic distempers, and, in short, to be well informed as to all points in vital statistics.

Now the only mode in which accurate information of this kind can be procured and rendered efficient and useful, is by obtaining from every part of the Queen's dominions correct returns as to the causes of death; and the persons, from whom this information can most effectually and accurately be obtained, are the practitioners in medicine. Some of these gentlemen may imagine that this is not their affair, and that however it may be the interest or the desire of the registrar-general to publish accurate reports, no benefit can in any way accrue to them. This we believe to be a great mistake. It is the interest of the whole community to get these returns made as correctly as possible; and it is doubtless the interest of the practitioners of medicine to be correctly informed as to all causes of disease and all causes of mortality; and to understand, as correctly as possible, all those circumstances which tend to increase or diminish the probability and the value of human life at different ages, and in different occupations. Many illustrations of the correctness of this sentiment we could give; but our limits will not permit us. The matter, however, we presume to be so self-evident as not to require formal demonstration. The healthiness or insalubrity of certain localities, of particular seasons, of certain combinations of meteorological phenomena, of particular professions, and certain modes of life, are all circumstances, which it is of the utmost importance for enlightened and judicious medical practitioners to know. It is only by combining in one great body to procure the requisite information, that substantial improvements can be effected. We therefore trust that they will unite cordially and vigorously in promoting the progress of this great object of medical statistics.

In the second place, it is proper to explain to medical practitioners the great pains that have been taken, and the mechanism that has been adopted, in order to facilitate the rendering of accurate returns.

In England and Wales there are 2180 registrars of births and deaths; and 900 registrars of marriages. These are placed under
t' ndence of 619 superintendant registrars, who have
'19 register offices, to which returns are made and
kept till forwarded to the central office in London.
were appointed four inspectors for the purpose of
trict, into which England is divided, giving infor-

mation to the registrars as to the mode of performing the duties, and seeing that the duties are correctly performed. This gives for all England and Wales

Registrars of births and deaths, 2180; Registrars of marriages, 900; Superintendant registrars in charge of register offices, 619; Inspectors, 4; Total, 3703.

Thus 3703 persons are engaged in carrying out the details of this system of registration, and in endeavouring to ensure accuracy in the returns.

It appears that among causes of inaccuracy at first experienced on the commencement of the working of the system, the most usual was, that the returns were given, not by medical practitioners, but by persons unacquainted with medicine. This cause will gradually diminish if medical men will lend their aid. It may never be wholly removed. But even where medical practitioners return the causes of death, errors may arise from natural difficulties, and, above all, when no anatomical inspection has taken place. Some also may arise from ignorance or inattention. But we are in hopes that all these causes must gradually give way; and that the causes of mortality in the different divisions of the island may be as correctly ascertained as circumstances will admit. It has always appeared to us, that many of the provincial and country practitioners, from the laborious nature of the duties they have to perform, read little or none after being settled. Hence their knowledge is nearly stationary, in the position which it occupied, when they were students. It would be very desirable that they should keep their knowledge on a level with that which is advancing generally; and that they should embrace all opportunities of rendering accurate their information in morbid anatomy and pathology. By attention to these subjects, the chances of fallacy and error would be materially diminished.

The statistical nosology published by the Registrar-General in 1843 must be of great use both in ensuring uniformity and directing the attention of medical observers to the correct ascertaining of the causes of death in every given case. It would be of importance also for practitioners to read one or other of the works referred to, in reference to the determination of questions, and the solution of doubts as to causes of death in doubtful cases. And as every practitioner can obtain a copy of the nosology gratuitously by applying at the office in London, there is no excuse for remaining ignorant of it or its distinctions.

The present, which is a new edition of this publication, consists of two parts; the first a reprint of the first edition of the statistical nosology; and containing also the circulars and instructions which have been since issued to registrars and medical practitioners;—the second containing a letter addressed by the Registrar-General to the coroners of the kingdom, relative to the returns of the causes of death by juries; and a classification with observations on the returns of deaths by violence. The latter had previously appeared in the sixth report, published in 1845.

In the present edition, immediately before the statistical nosology are placed *Suggestions to Medical Practitioners respecting the mode of returning the causes of Death.* We are so thoroughly convinced that attention to these suggestions would tend greatly to exclude the sources of error to which we have above adverted, and contribute to accuracy and uniformity in registration, that we think it most important to request to them their serious and deliberate consideration; and as they are not long, to save time we subjoin them.

"(1.) State the causes of death in terms as precise and brief as possible; and use, if convenient, the names recommended in the Nosology, for the sake of uniformity. The column of the Register Book for the entry will contain *about ten words.*

"(2) Write the causes of death in the order of their appearance, and not in the presumed order of their importance.

"(3.) The duration of primary and secondary diseases in these returns will always be considered to imply the time intervening between the first appearance of well-marked characteristic symptoms —and death. Small-pox, scarlatina, erysipelas, typhus, and all febrile and inflammatory diseases should, however, be dated from the rigors and first symptoms, not from the later appearance of the eruptions, &c. The time in the certificate, opposite the primary disease, will therefore include the whole term of illness. Thus: 'Scarlatina maligna, 21 days; purulent infiltration, 7 days, (P. M.);' implies that the earliest symptoms of scarlatina occurred 21 days before death; and that 7 days before death purulent infiltration was observed. So, 'Hooping cough, 16 weeks; paralysis of motor nerves, right side, 4 weeks; pneumonia, 3 weeks,' is understood to mean that symptoms of the cough appeared 16 weeks, of the paralysis, 4 weeks, of the pneumonia 3 weeks before death. Confusion has been produced in some returns by inattention to this point.

"No attempt should be made to guess the duration of *latent* stages of diseases; but it will generally be possible to fix on a point of time near the access, when the patient had *no symptoms* of disease, and another, when the symptoms were unequivocal: if the disease be dated from the middle point of the intervening time, the results will be sufficiently accurate. The duration should be stated in *minutes* or *hours*, when the disease is fatal in less than 48 hours; in days, in diseases of less than 50 days' duration; in weeks or years, for diseases of still longer duration. *Month* is an equivocal term, as a *measure* of time; when used in the returns, it will be deemed the *twelfth* part of a year.

"(4.) State, in fatal cases of small-pox, measles, scarlatina, typhus, rheumatism, mania, delirium tremens, apoplexy, and the like diseases, whether it be the second, third, &c. attack, whenever the patient has sustained more attacks than one. In ague, epilepsy, convulsive diseases, angina pectoris, syncope, and other maladies which occur in fits or paroxysms, date the illness from the first fit; and add the duration of the last fatal fit: thus: *epilepsy* 5 *years; last fit* 6 *hours.*

"(5.) Surgeons, in all cases of operations, should return (*a*) the primary disease or injury—(*b*) the operation—(*c*) the secondary diseases—such as erysipelas, purulent deposits, &c.; and should state also the time from the commencement of the primary disease—the time from the operation—and the time from the appearance of secondary disease, *reckoning in each instance to the death.*

"(6.) It sometimes happens that the nature of the fatal disease cannot be discovered—even after a *post mortem* examination of all the organs—and still more frequently in the absence of an examination. *In such cases it is better to name one or more of the leading symptoms and peculiar appearances*, than to assign a specific cause on imperfect, inadequate evidence. P. M. should be added when the causes of death have been verified by a post mortem inspection.

"The *examples* from the certificates received are not all given as specimens of perfect returns of the causes of death, but as illustrations of the manner in which the facts are viewed and stated in the present state of medical knowledge.

"NOTE.—In order to be in a position to return the causes of death accurately, medical practitioners are earnestly recommended to keep brief memoranda of all the cases which they attend, in the simplest form, such as is given below. The private register of the medical practitioner would at the end of a few years be of incalculable interest to him; he might refer back to it for important information, transmit it to his sons or successors in practice, analyse the results of his experience; and, in conjunction with his brethren, all over the country, would ultimately accumulate a vast series of materials, which could not fail to advance medical science.

"Engaged in the practice of a laborious profession, medical men should not attempt too much at first; all cases should be noticed; but those facts should be chiefly recorded which are of an unequivocal nature, and that admit of precise statement, and comparison in respect to number, time, weight, and measure.

| No. | Name of Patient and Residence. | Sex. | Age last Birthday.) | Profession: Habits. | Diseases. | | Dates of important Facts in the Case: and of the resulting Recovery or Death. |
|---|---|---|---|---|---|---|---|
| | | | | | Primary and Secondary. | Date of their Appearance. | |
| 1[*] | John Jones, 7 Drury Lane. | M. | 7 | A day scholar; (father a master tailor). | Measles;<br>Pneumonia. | March 5<br>March 12 | Patient first seen *March* 9; the eruption of measles then visible: appeared on the 8th; cough, rust-coloured sputa, crepitation, 12th; left lung consolidated, 14th; last seen, March 19th; *died March* 20th. P. mortem; left lung hepatized; pleura adherent. |

[*] The Number will refer to the prescription book for treatment.

"The importance of instituting *post mortem* examinations very generally, cannot be too strongly urged. It is impossible to calculate how much suffering and untimely death are occasioned by depriving physicians and surgeons of the information derivable from this source. In ordinary cases no attempt is made to preserve the body from corruption, when life is extinct; and the examination by medical men of the state of the internal structure, instead of accelerating decay, may be made, by embalming, a means of preserving the frame from decomposition; if it were not rather desirable and more in consonance with the best feelings—that the elements—water, air, carbon, and the salts—of which the earthly tenement is composed, should be restored as soon as possible to their free state—to be again re organised and re-animated."—Pp. 12, 13.

We have only to say, that these directions, which may be easily carried into effect, would most materially tend to render the returns, and consequently the reports, as free from error as can reasonably be expected. The suggestions regarding the necessity of ascertaining, by regular anatomical inspection, the cause or causes of death in every doubtful case, it is impossible to impress too forcibly on all concerned. Without the evidence derived from this source, the returns must in many cases be uncertain, and in some erroneous. Upon managers and governors of hospitals and similar public institutions, it is above all incumbent to promote and to enforce this practice by every means in their power; and we feel it absolutely necessary to direct attention to this subject at the present time, because we have known instances in which, instead of favouring and facilitating this duty, they have shown to it either indifference or actual hostility.

Scotland has as yet no system of general registration. In Glasgow a local registration was commenced under the auspices of the magistrates by the late Dr Cleland, and is now continued with much diligence by Dr Watt, who publishes annual reports. A similar system has recently been commenced in Edinburgh, also under the auspices of the local municipal authorities; and it is proposed to publish quarterly and annual reports.

These, however, are merely local registrations. A system of registration, to be efficient and useful, must be universal; and must be enforced by legislative enactment. This, we hope, will soon attract the attention of government, and procure for Scotland the advantages which must result from a legislative measure.

# PART III.

## MEDICAL INTELLIGENCE.

### PHYSIOLOGY.

*On the size of the Red Corpuscles of the Blood in the Vertebrata, with copious Tables of Measurements.* By George Gulliver, Esq., F. R. S. (Proceedings of the Zoological Society, No. CLII. 14th October 1845.)—Dr Gulliver has arranged in the tabular form all the results of his observations on the blood corpuscles.* These tables include results obtained in 485 species, here systematically arranged, so as to exhibit a summary, and yet more complete view than any yet extant, of the size of the blood-corpuscles in the different subdivisions of vertebrate animals.

Mammalia.—*Various sizes of the corpuscles.* The corpuscles of the elephant are the largest yet known; then follow those of the sloth and of the whale. The Napu musk deer has the most minute corpucles; those of the Stanley musk deer are nearly as small; those of the Ibex of Candia are larger; and the next increase of size is in those of the goat. Before my observations, the corpuscles of the last-named animal were the smallest known.

*Size of the corpuscles in relation to that of the animal.*—The smallest British mammal, the harvest mouse, has corpuscles quite as large as those of the horse; in the common mouse they are larger than in the horse or ox. But although there is no relation between the size of the corpuscle and that of the animal in different orders, in the same order the larger species have generally larger corpuscles than the smallest species. Thus, in the large ruminants the corpuscles are distinctly larger than in the smallest ruminants, and the same fact is observable of the rodents. In these examples the gradation in the size of the corpuscles may not exactly follow that of the animals, but none of the very small species have corpuscles so large as those of the largest species.

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* On the Corpuscles of Marsupiata, of the *Camelidæ*, and of *Moschus Javanicus*, Annals Nat. Hist., Dec. 1839, Phil. Mag. same date, and Dublin Med. Press, Nov. 27, 1839; on the Blood-Corpuscles of Mammalia and Aves, in an Appendix to the English version of Gerber's Anatomy, 8vo. Lond. 1842; on the Nuclei of the Blood-corpuscles of Vertebrata, Note to Dr Willis's tr. of Wagner's Physiology, p. 240 *et seq.*, 8vo. Lond. 1844, and Phil. Mag., Aug. 1842; on the Pus-like Globules of the Blood, Phil. Mag., Sept. 1842, and Note to Wagner's Physiology, p. 250–252; on the Blood-corpuscles of the *Camelidæ* and of the Musk Deer, Med. Chir. Trans. v. xxiii. and Lancet, v. ii. 1840–41, p. 101; on the Corpuscles of the Snowy Owl and Passenger Pigeon, Proc. Zool. Soc., June 9. 1840; Corpuscles of *Crocodilidæ, ibid.* Nov. 10, 1840; Corpuscles of Paradoxures, *ibid.* Nov. 24, 1840; Corpuscles of *Feræ*, *ibid.* May 25, 1841; Corpuscles of Marsupials, *ibid.* June 8, 1841; Corpuscles of the Ibex and of Ophidian Reptiles, *ibid.* Aug. 9, 1842; Corpuscles of *Struthionidæ*, *ibid.* Oct. 11, 1842; Additional Measurements of Blood-corpuscles, *ibid.* Dec. 13, 1842, Feb. 13 and Sept. 10, 1844; Corpuscles of the Stanley Musk Deer, *ibid.* May 9, 1843; Corpuscles of the Sloth, *ibid.* June 11, 1844: on peculiar shapes assumed by the Blood-corpuscles of mammals, Phil. Mag., Nov. 1840; on the Buffy Coat of the Blood, Edin. Med. and Surg. Journ. No. 165.

*Size of the corpuscles in the same animal at different periods of life.*—In very young embryos the corpuscles are much larger than in the adult, and in such embryos each corpuscle has a nucleus, which disappears at a later period of intra-uterine life, when the corpuscles are yet larger than those of the mother. At a still later period they become so unequal in size that it is difficult to say whether they be larger or smaller in the fœtus than in the adult. In a kid twelve days old, bred between an ibex and a goat, I found the corpuscles larger and more variously sized than those of either of its parents.

*The thickness of the corpuscles* is variable; but it is commonly somewhat more than a fourth of the diameter.

*Size of the corpuscles in different Orders.*—The monkeys have corpuscles pretty uniform in size, generally just perceptibly smaller than those of man; in some of the monkeys of the new world the corpuscles are slightly smaller than in the monkeys of the old world, and in the lemurs somewhat smaller still. In the corpuscles of the different subdivisions of the *Feræ* there is such a well-marked diversity of size, that the fact* might be used as a help to classification. The families, set down in the order of the size of their blood-discs, stand as follows: seals, dogs, bears, weasels, cats, viverras. It is commonly most easy to distinguish a viverra, by the comparatively small size of its blood-corpuscles, from a seal, dog or bear. Among genera of doubtful affinities, if regard were paid to the blood-corpuscles, the hyæna† would be arranged with the *Canidæ*, basaris with the *ursidæ*, and cercoleptes with the *viverridæ*. It is curious that the fox has slightly smaller corpuscles than the dog. In the ruminants the smallest corpuscles are found; yet some of the largest species have corpuscles larger than those of many carnivora, and of the horse. The *camelidæ* are the only mammals with oval blood-discs, like those of the lower vertebrata in shape, but uniformly smaller; and in structure the corpuscle of the camels is exactly the same as the corpuscle of other mammalia, being destitute of a nucleus corresponding to that which is so obvious in the corpuscle of lower animals. Among the Rodents, the corpuscles of the capybara are as large or slightly larger than those of man; the harvest mouse has smaller corpuscles than any other rodent, and in the order generally their size is about the same as in the lemurs. Of the Edentata, the two-toed sloth has the largest corpuscles, after those of the elephant, of any mammal; those of the armadillo are about the same in size as those of the monkeys. The corpuscles of the marsupiata agree generally in form and size with the corpuscles of the corresponding placental mammals. In the monotremata, according to the observations of Dr Davy, Dr Hobson, and Dr E. Bedford, the corpuscles are of the same form and about the same size as in man. An examination which I made of the corpuscles of the echidna was to the same effect, but I had not an opportunity of applying a micrometer to them.

Oviparous Vertebrata.—In birds and reptiles, with a few exceptions, the corpuscles are oval, the long diameter being commonly rather less than twice the short diameter. These proportions used to be considered as universal, but they are not so; for the long diameter of the corpuscles of birds and reptiles may either be nearly thrice or scarcely one and a half of the short diameter; and it is remarkable that these differences of form are occasionally presented in the corpuscles of nearly allied genera, as more particularly explained in the Proc. Zool. Soc. 1840, pp. 43 and 132; and 1842, p. 110. In osseous fishes, as Professor Wagner has noticed, the corpuscles are generally not much longer than broad; I commonly found a few among them of a circular shape, and he observed the majority of them of this figure in the blood of the cyclostomes. In some species of other orders the corpuscles are about twice the length of their breadth; in the pike they are somewhat angular and pointed at the ends; and on the whole the corpuscles of fishes are extremely variable in shape. The diameter of the circular corpuscles of mammals is very frequently about the same as the short diameter of birds' corpuscles. They are largest in the amphibia generally; and largest of all in the amphibia with permanent gills, as discovered some years ago by Professor Wagner. My measurements of the corpuscles of the siren agree with his view.

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* It has recently been enlisted into the service of natural history by Mr Jesse, in his interesting Anecdotes of Dogs.

† It is remarkable that the extent of the streaked muscular fibre of the gullet of the Hyæna is the same as in the *Viverridæ*, which differ in this respect from the *Canidæ*, and still more from the *Ursidæ*. See Proc. Zool. Soc., Sept. 10, 1839, and June 14, 1842. It would be interesting to examine the œsophageal muscular sheath of the Kinkajou.

*Nucleus.*—This exists permanently in the blood-corpuscle of the lower vertebrata, but only for a short time in that of mammals, not excepting even the *camelidæ*. It is only during the earlier period of intra-uterine life that the corpuscle of mammals has a nucleus corresponding to the permanent one in the corpuscle of lower animals. In birds, the nucleus, when exposed by a weak acid, is commonly longer in proportion to its breadth than the envelope; but there are some exceptions, and the nucleus becomes globular or nearly so when in contact with water. In the blood-corpuscle of mammals the central spot, so often mistaken for a nucleus, is not visible in the best focus and light; then if the object-glass be so slightly removed from the corpuscles as not to destroy their clear contour, a dark spot appears in their centre; if the glass be next so far moved towards the corpuscles as to place them slightly within the focus, the dark spot will become bright; and when altogether invisible in a bright light, the spot may be instantly brought into view simply by diminishing the light.

## *On the Digestion of Vegetable Albumen, Fat, and Starch.* By ROBERT D. THOMSON, M.D., Lecturer on Practical Chemistry in the University of Glasgow. (*From the London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science for* May 1845.)

*Digestion of Vegetable Albumen and Fat.*—Nearly three years ago Dr A. Buchanan communicated to me the fact, that he had frequently observed the serum of the blood to present a white appearance when a person happened to have been bled for some affection of such a circumscribed nature as not to interfere with the appetite or digestion; but an opportunity did not occur to me of examining this peculiar serum till the end of 1843, when Dr Buchanan was so kind as to place some of it at my disposal. The fluid presented the appearance of thin milk, being covered, after standing, on the upper surface with a whitish scum of a denser character than that which was diffused through the fluid. When the fluid was filtered, a portion of the scum remained on the filter, while the liquid passed through, possessing still a milky aspect, but obviously being deprived of a considerable portion of its denser particles. Dr Buchanan however observed that this white matter might be accumulated in larger quantities, or at least collected into smaller bulk, by saturating the serum with common salt, when the white matter speedily rose to the surface in the form of a creamy layer, which did not change its physical character even when kept for months.† I found that the white matter, both when separated simply by the filter and also when precipitated, if we may so speak, by common salt, contained a substance which was insoluble in æther and alcohol, and that when dissolved in caustic potash and the solution was boiled with acetate of lead, a black precipitate of sulphuret of lead fell.* These experiments were several times repeated carefully with the same result, and were witnessed by Dr Buchanan, so that we had no doubt in our own minds that the presence of traces of an albuminous substance in the white matter of this serum was established; and we had subsequently opportunities of obtaining this matter in larger quantities, so as to confirm the previous experiments.

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* Read before the Physiological Society of Glasgow, February 5, 1845.

† See a paper on this subject by Dr Buchanan, Proceedings of the Philosophical Society of Glasgow, vol. i. p. 226.

These results led to a series of researches upon the effect of food upon animals, and also on man; from which it was clearly demonstrated that the white colour of the serum in healthy animals is dependent on the introduction of food into the system. The detail of one or two experiments will place this conclusion in a distinct point of view. It was necessary for this purpose to observe the characters of the serum of an individual who had not tasted food for such a space of time that the effects of the previous meal should have disappeared. On the 10th of March 1844, from a stout young man, aged thirty, who had tasted no food from the preceding evening at six o'clock P.M., two ounces of blood were taken at noon, or at an interval of eighteen hours after a meal. The blood coagulated on standing in the usual manner, and the supernatant serum was found to possess a pale yellow colour, and to be perfectly clear and limpid.

After the abstraction of the blood, the individual dined upon twenty-four ounces of a pudding consisting of two parts of wheat flour and one part of suet, seasoned with salt. At three o'clock, or in about three hours after the food had been swallowed, seven ounces of blood were taken by venesection from the arm. The clot formed as usual, no appearance of a buffy coat presenting itself. The serum was whitish and opaque; when heated it became more translucent, apparently from the solution of some of the solid particles diffused through it, or, as was afterwards apparent, from the liquefaction of the fatty matter diffused through the serum. The whole fluid possessed a somewhat syrupy cast of appearance, and was very heavy, its specific gravity being as high as 1029·8. Comparing this density with the average density of serum as we find it in physiological works, 1026½ by Dr Thomson, 1027 to 1029 by Müller, it must be pronounced high; but as the specific gravity of this fluid has never been properly estimated in perhaps the truly healthy condition of animals, and more especially in parallel cases with that described, no conclusion can be deducted in reference to the density of the serum as compared with the normal standard. On throwing the serum upon a filter, a portion of white matter remained attached to its interior surface, while the liquid which passed through retained still a milky aspect; but perhaps the most interesting result obtained by this experiment was, that on drying the filter and holding it between the eye and the light, it was found to have imbibed a considerable amount of oily matter. The white substance remaining on the filter presented characters similar to those of albuminous or fibrinous matter.

The facts detailed having shown that there was a decided distinction between the serum of a person previous to and after taking food, it became an interesting point to pursue the inquiry, and to ascertain how long the milky aspect would continue in the blood. Accordingly, at six o'clock P.M., or six hours after the meal, the individual was a third time bled to the extent of seven ounces. The serum was in this case very milky, and threw up, on standing, a considerable white scum to the surface, which could be drawn up by a sucker and examined. On throwing the serum on a filter, a small portion of white matter adhered to it, possessing albuminous characters; the serum passed through with a milky colour, but no imbibition of oil could be detected on the filter itself. A careful examination of this specimen of serum could detect not a trace of starch by means of iodine and chlorine, and this led to the investigations detailed in the subsequent parts of this paper.

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* This test for sulphur in albumen was employed in 1812 by Vauquelin.

The inferences deducible from this experiment appear to be,—1st, that the serum of a healthy individual at a certain period of time, after partaking of a meal, is clear and limpid, and corresponds with the description of this fluid as we find it detailed in physiological works of authority; 2d, that in three hours after a meal, when the food consists of vegetable albuminous matter and oil or fat, the albumen begins to make its appearance in the blood, while a still larger quantity of fat in relation to the amount of the albumen taken into the stomach exists in the blood; and 3d, that in six hours, while the quantity of albuminous matter in the blood can be detected, the fatty matter has comparatively disappeared; a conclusion which is completely in accordance with the chemical properties of these substances, since we know that some kinds of fat liquefy nearly at the temperature of the human body, and will, of consequence, be in a condition immediately after their introduction into the stomach to enter the sanguineous circulation along with the water present in the stomach, since that fluid appears capable of permeating with great facility the coats of the intestinal canal throughout its whole length.

To determine the manner in which the food thus passes into the circulating system, is scarcely the province of the chemist. At the same time, since it appears to exist in the current of the blood without having undergone much modification of state from that which it originally possessed in the stomach, there seem no obvious arguments to present themselves against the conclusion that the food is directly absorbed from the alimentary canal by the blood-vessels themselves.

In confirmation of the experiment already detailed, the physiological part of which was conducted by Dr Buchanan, whose great merits as a physiologist and original observer require no encomiums from me, various repetitions on the inferior animals were conducted by myself, which it would serve no purpose to enumerate minutely, since they all conducted to the same results.

In the majority of these cases calves were fed on gruel and milk, and after various intervals they were slaughtered. The serum on examination, when the animal was killed from three to six hours after the meal, was found to be milky, and to leave a greasy stain on filtering paper when the amount of milk or fatty matter used was considerable, while the serum taken from an animal which had been subjected to starvation for a space of time varying from twelve to twenty-four hours, presented generally a clear aspect. It has been frequently remarked that the serum of diabetic patients exhibits often a milky appearance, and the circumstance of the co-existence of disease with the white serum was considered as a proof that the disease was the cause of the colour of the liquid part of the blood: but it has been very properly remarked by Dr Buchanan, that the large amount of food consumed by individuals affected with this disease, affords a satisfactory mode of accounting for the presence of such profuse quantities of albuminous and fatty matter in the blood in such instances. I have recently had opportunities of studying this form of serum through the kindness of Dr William Thomson, and I have found no reason to conclude that the blood of diabetic patients, so far as its milkiness is concerned, is more diseased than that of healthy individuals after a full meal. It is no doubt highly probable that the blood in these instances remains for a longer time loaded with the white matter than in the healthy state of the organism, and that the appetite may, by continually urging in a new supply of food, thus produce a diminished rate of digestion or assimilation in the circulating system; but the presence of the white matter in the serum it would be erroneous to consider as a symptom of disease, at least in so far as the data entitle us to draw such an inference.

*Changes produced on Starch in Digestion.*—As it appeared to be a matter of importance in the investigation of the changes occurring in the stomach during digestion, in order to prevent complication of the phænomena, that the food should be as simple as possible, I have chosen for the experiments about to be detailed, cases in which animals were fed on vegetable food alone. In general the species of food selected was porridge, or a mixture of oatmeal and water well boiled. In such experiments as I have seen detailed, in reference to the free acid of the stomach, there appears to have been too little attention paid to the possible results which might arise from a difference in the nature of the food. Thus the products of the digestion of starch we should naturally expect to be different from those of the digestion of animal fibrin or albumen, since we know that lactic acid can be produced by a modification of starch, although the same change does not attend the decomposition of the animal substances enumerated. For example, in the preparation of starch an acid liquor collects on the surface of the vessels in which the starch is digested, and in the formation of *sowans* from oat-husks and water by steeping, an acid liquor is developed,—in both instances a consequence of the production of lactic acid at the expense of starch; while in the German dish, saurkraut, the same acid is generated by an analogous action. I do not at present intend to discuss the nature of the acid which presents itself in the stomach during the digestion of animal food, but simply to detail the results of a series of experiments upon the changes produced on vegetable food and starch during digestion. I shall merely content myself with stating, that I have never found a volatile acid in the stomachs of animals which were digesting animal food alone, while in these cases I have invariably found an acid to be present which was fixed at the temperature of 212°, and even considerably higher.

*The nature of the Acid developed during the digestion of Starch.*—It does not appear an invariable rule that an acid reaction should always characterize the liquid present in the stomach during digestion, as appears from the following experiment. On the 11th of July 1844, the different stomachs of a sheep killed twenty-four hours after partaking of grass, contained between two and three pounds of finely-divided green matter exhibiting a pulpy consistence, but being entirely destitute of either an acid or alkaline reaction. The pulpy masses were tested in each of the stomachs with the same negative result, and they were afterwards mixed together, diluted with distilled water and filtered, but still without producing any effect on litmus paper. Experience teaches us, that to determine the presence of a volatile acid in the stomach, great care must be taken in reference to the mode in which the distillation is performed, since if the heat of an open fire is applied to the retort, an indication of the presence of hydrochloric acid will be found in the liquid contained in the receiver by the addition of nitrate of silver. The following experiment affords evidence in favour of this position, and it might be strengthened, if necessary, by the results obtained by other experimenters. The contents of the stomach of a dog which had been fed on porridge made of oatmeal and water, and which afforded an acid reaction with litmus paper, were mixed with distilled water and filtered. On exposing the distilled liquor to the heat of an open fire in a retort, a fluid passed over possessing an acid reaction, and becoming opalescent on the addition of a solution of nitrate of silver, and without disappearance in contact with nitric acid; a result plainly indicative of the presence of chlorine in some form in the liquor of the receiver, but, as appeared by the subsequent inquiries, to be explained by the fact that muriate of ammonia must have been carried over by the vapour of water in consequence of the excess of heat.

To determine in a satisfactory manner therefore the presence of a volatile acid, it is necessary to distil the fluid contents of the stomach in a water-bath. With this consideration in view the following experiment was made. June 1844, a pig was fed on potatoes and greens, and was killed in half an hour after the food was swallowed. The stomach was slit open, and as much of the fluid contents as possible were poured off; the solid contents were then digested in cold distilled water. Both fluids were filtered and mixed, each previous to being united being found to exhibit an acid reaction with litmus infusion. To ascertain whether the statement made by a French physiologist (Blondlot) is correct, viz. that the acid of the stomach cannot be saturated with chalk, a quantity of pure carbonate of lime was prepared by dissolving Irish limestone in hydrochloric acid, precipitating a small portion of phosphate of lime and iron which it contains with caustic ammonia, and then throwing down the lime with carbonate of ammonia, collecting the precipitate on a filter, washing it well with distilled water, and heating it to redness in a platinum crucible. An excess of this chalk was then added to the filtered fluid of the stomach, and the mixture was allowed to remain for twenty-four hours, disturbed only by frequent agitation. It was then filtered, and found to have been completely neutralized. Having often repeated this experiment on various specimens of gastric fluid with the same effect, I can only account for the different result obtained by Blondlot, by supposing that he had attempted to complete his neutralization of the fluid while it was in a heated state, and that possibly, if acetic or lactic acids were present, these acids might resist neutralization at an elevated temperature, since it has been found by manufacturers of pyroligneous acid that they cannot succeed in forming a neutral acetate of lime at a temperature approaching that of the boiling-point by chalk alone, but that they require to add milk of lime in order to overcome the acid reaction. Blondlot has deduced the inference from his experiment, that the stomach owes its acid reaction to the presence of an acid phosphate of lime; but as the experiments now detailed do not coincide with those of the French physiologist, it is sufficiently obvious that they do not support him in his conclusions.

Being thus foiled in corroborating the deduction of Blondlot, that phosphoric is the free acid of the stomach, it was requisite to look out for another source of the acidity of the gastric fluid. It was therefore necessary to test the muriatic or hydrochloric acid theory, as propounded by the sagacity of Dr Prout.*

The contents of the stomach of a pig which had been fed on porridge two hours before being killed, were mixed with cold distilled water and filtered. Six fluid ounces of this fluid, which was quite clear and limpid, were introduced into a retort and distilled in a water-bath. The distillation occupied several hours; three ounces of fluid were distilled over, which possessed the peculiar smell of such fluids, and reddened infusion of litmus slightly. The three ounces of fluid remaining in the retort had a strongly acid reaction, and gave no appearance of acetic acid on the addition of chloride of iron. From twelve ounces of another portion of the same gastric fluid, four ounces of fluid were distilled over by the heat of the water-bath, which presented the same characters as those of the distilled fluid just described; but in neither instance could a trace of hydrochloric acid be detected by nitrate of silver.

With the liquor remaining in the retort, three experiments were made to determine the possible amount of free hydrochloric acid, on the supposition that the preceding experiment did not serve as evidence to prove the impossibility of its presence. Three equal portions of the fluid were measured out, to the extent of two fluid ounces in each portion.

1. To the first portion, a solution of nitrate of silver was added until a precipitate ceased to fall; pure nitric acid was then mixed with the liquid,

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* See Phil. Mag. S. 2, vol. iv. p. 3 and 120.

and the temperature raised to the boiling-point. The precipitate was filtered, washed, and weighed.

2. The second portion was evaporated to dryness and ignited; the residue was dissolved in water and precipitated by nitrate of silver, the solution being acidulated with nitric acid and brought to the boiling-point.

3. The third portion was exactly neutralised with caustic potash, evaporated and ignited; the residue dissolved in water, and the solution precipitated by nitrate of silver.

The results of these experiments are indicated in the following table in grains:—

| Experiments. | Weight of Chloride of Silver. | Weight of Chlorine. | Weight of Hydrochloric Acid. |
|---|---|---|---|
| 1st, . | 7·81 | 1·95 | 2·00 |
| 2d, . | 7·17 | 1·79 | 1·84 |
| 3d, . | 7·97 | 1·99 | 2·04 |

The atomic weights here employed are Dr Thomson's.

Oxygen = 1·
Hydrogen = ·125
Chlorine = 4½
Silver = 13½

The correspondence between the first and third experiments shows that in the first no organic substance had been in union with the silver, which was precipitated by chlorine alone, and that there is no evidence from these results of free muriatic acid being present. The conclusion is the reverse, since if any free muriatic acid had been neutralized by the potash the third experiment ought to have given an inferior quantity of chloride of silver, because the sal-ammoniac ought to have been sublimed. The potash which was added, I conceive, in the third experiment, united with an organic acid; the salt formed was decomposed by the incineration, and the potash united to the chlorine previously in union with ammonia; for that sal-ammoniac or a volatile muriate was present is proved by the second result.

It is well known that Dr Prout by similar experiments drew the conclusion that free hydrochloric acid was present in the stomach. That distinguished chemist, however, omitted the first experiment which I have described. Indeed he could not have made it successfully under the circumstances in which he operated, because the gastric juice in his experiments was not exposed to a heat that could coagulate and separate the albuminous matters, which would then have combined with the oxide of silver and have complicated the result. In the gastric juice employed in the preceding researches, however, nothing was present but soluble starch or dextrin and sugar, which formed obviously no compounds with silver, insoluble in boiling nitric acid. It is possible, therefore, in the experiments of Dr Prout, who determined the total amount of chlorine in the gastric fluid by supersaturating with potash, igniting and precipitating with nitrate of silver, that he had formed cyanide of potassium, which would precipitate cyanide of silver along with the chloride, unless the precaution were taken not merely to *add* nitric acid, but to *boil* the solution after the addition of the acid, since cyanide of silver is insoluble, or at least not wholly decomposed by cold nitric acid. I offer this explanation, originally proposed by Leuret and Lassaigne, because from my knowledge of Dr Prout, I am quite certain his experiments were most accurately made. Indeed, the testimony of all succeeding experimenters who have obtained the same results is sufficient to establish his accuracy without the addition of any confirmation on my part. It is even possible that, in cases where the food is different, the acid may be of the nature described by Dr Prout.

The experiments which have been detailed seem to demonstrate that no free hydrochloric acid existed in the stomach of the animal, under the circumstances described, since no acid could be distilled over at a temperature greatly above that at which this acid boils when sufficiently concentrated, while the fluid in the retort became more intensely acid in proportion as the distillation proceeded. A portion of the liquid from the retort was evaporated to dryness and heated to a temperature exceeding 300° without giving out acid fumes; the residue was digested in water, and still retained an acid reaction. The solution of this residue was easily saturated by carbonate of lime, and was not precipitated by chloride of calcium, indicating the absence of biphosphate of lime (contrary to the views of Blondlot), and likewise of free sulphuric acid.

In another experiment the gastric juice was evaporated to dryness in the water-bath, and treated with alcohol and oxide of zinc with the necessary precautions; prismatic crystals were obtained corresponding with lactate of zinc, but in too minute quantity to admit of analysis, the only demonstrative argument. The preceding experiments appear to show, however, that the free acid of the stomach, in the digestion of vegetable matter at least, of all the known acids, alone corresponds with the lactic. To determine the nature of the volatile acid, which, however, appears to be present always in minute quantity, a portion of gastric fluid was distilled, and the product was obtained in three distinct receivers. Their characters, as determined by infusion of limitus, were as follows:—

| | Infusion of limitus. |
|---|---|
| 1st product of distillation amounted to . . . | 1 oz., bright red colour. |
| 2d . . . | 1½ oz., paler than preceding. |
| 3d . . . | 1 oz., slight red colour. |

From these observations, it would therefore appear that the greatest amount of volatile acid was carried over at first, and that as the distillation proceeded its amount in the retort gradually diminished, indicating that the acidity was not due to the decomposition of lactic acid or its eduction by the vapour, but rather to the presence of acetic acid. The quantity present was, however, trifling, since the distilled product of a large amount of gastric fluid could never be detected in a state of effervescence on the addition of carbonate of soda.

*Dextrin and Soluble Starch found in the Stomach in the Digestion of Starch.*—I have already stated in a previous part of this paper that I was unable to detect any traces of starch in the serum of the blood. It was therefore necessary to return to the stomach, and to observe the chemical changes to which the starch was subjected in that viscus. When an animal is fed on porridge, if water be added to the contents of the stomach, the mixture well stirred and then allowed to stand at rest, the supernatant liquor produces a blue colour with tincture of iodine; but if the liquid be filtered, the colour obtained by mixing the solution of iodine with the filtered liquor is red, indicative of the presence of dextrin, or one of the varieties of soluble starch. I have sometimes found, however, that starch has existed in solution in the gastric fluid even when neither a blue nor a red colour was indicated by iodine. This substance I have isolated by boiling the gastric fluid in order to coagulate the albumen, evaporating to dryness in the water-bath, and then removing the sugar and oil by means of alcohol. The substance thus obtained gave no decided indications with tincture of iodine previous to isolation when dissolved in water, and therefore corresponds with that variety of soluble starch which has frequently been described by chemical writers. It appeared a point of some importance to ascertain whether the transition of starch into dextrin takes place at once in the stomach, or whether the change commences before the food is swallowed. I accordingly prepared a quantity of porridge by boiling it for upwards of half an hour with distilled water, and on filtering it I obtained distinct evidence of the presence of dextrin in the filtered liquid. It may perhaps, therefore, be legitimate to infer that one of the important purposes to be acquired by cooking starch is to facilitate its conversion into soluble dextrin, and that other form of soluble starch already described; and hence the importance of the boiling being continued for a considerable space of time, when some of the harder species of amylaceous food, as rice, sago, tapioca, are used as articles of diet, and especially when they are administered to the delicate stomachs of the sick.

The soluble starch was separated in the manner already detailed, and was found to possess the following constitution when subjected to organic analysis:—

| | | | |
|---|---|---|---|
| 7·29 | grains | gave | 9·86 $CO_2$ |
| 7·11 | „ | „ | 9·54 $CO_2$ |
| 13·93 | „ | „ | 7·97 HO |
| 7·29 | „ | „ | 4·05 HO |
| 7·11 | „ | „ | 4·03 HO |

The result of these analyses per cent. is as follows:—

| | 1st. | 2d. | 3d. |
|---|---|---|---|
| Carbon, | — | 36·88 | 36·59 |
| Hydrogen, | 6·31 | 6·17 | 6·29 |
| Oxygen, | — | 56·95 | 57·12 |

This composition does not agree with that of starch, except with wheat starch, in the carbon before that substance has been dried; but according to the analyses of Prout, the hydrogen in wheat starch is greater in amount than in the present case. The carbon in the substance under consideration agrees with that of sugar of starch, but the hydrogen is much inferior; and the three experiments detailed agree so closely in reference to the hydrogen, that there can be little doubt of the accuracy of the results, more especially as the last analysis was made with the oxide of copper and chlorate of potash, and the matter subjected to analysis appeared to be completely burned. The substance appears to have possessed some intermediate characters between those of sugar and starch.

*Sugar in the Blood.*—The preceding results show that a matter closely corresponding with sugar is found in the stomach. Experiment was scarcely necessary to prove that sugar exists in the stomach, since as all flour and meal contain sugar, it is obvious that when these articles of diet are swallowed, sugar must be present in that viscus. But as it exists in the stomach, it is natural to expect that it should pass into the blood-vessels, and be capable of being detected in the mass of the sanguineous circulation. That fermentation can be excited by yeast in many of the fluids of the body, was long ago shown by Tiedemann and Gmelin. Dr A. Buchanan during the course of last winter obtained traces of carbonic acid from serum by fermentation, and I repeated the experiments with success; but I found it necessary to be careful in such a delicate experiment, that no source of fallacy should be present to complicate the result, and that in order to arrive at a demonstration of the presence of sugar in the blood, it would be requisite to resort to weighing. For this purpose I employed what may be termed a saccharometer. It consists of two light phials or flasks connected by a bent tube, one or both of which possess a safety-tube. The serum or fluid to be examined is weighed out in one of the flasks, which is placed in a vacuum, or in hydrogen gas, to remove any carbonic acid in solution, while into the other is introduced a solution of barytes, the bent tube dipping considerably under the surface of the barytes solution. Yeast being mixed with the serum, the connection between the flasks is established, and the whole apparatus placed in a warm atmosphere (70°). Fermentation speedily begins if sugar is present, and the carbonic acid as it passes over precipitates the barytes in the form of carbonate. In twelve hours the action will be at an end; the flask containing the serum is then to be heated to carry over any $CO_2$ which may remain in its atmosphere by means of vapour. I prefer this method to using a safety-tube in the second phial, because it is difficult to wash off the carbonate of barytes, which is apt to adhere to the ends of the tubes.

The carbonate of barytes is then to be thrown on a small filter covered with a plate of glass, washed, ignited, and weighed. Every 49 grains of it are equivalent to 22·5 of sugar existing in the blood.*

By means of this process, I found that the serum of a pig, which had been starved for at least twelve hours, then fed on porridge, and killed three hours afterwards, afforded by the fermentation of 1000 grains ·80 carbonate of barytes, = 5·6 grains per pound or to 2·57 grains of sugar.

In another experiment the serum of the pig was employed from whose stomach the soluble starch was extracted.

| | | | | |
|---|---|---|---|---|
| | 520·27 grains of serum gave | | | |
| | ·68 | ... | carbonate of barytes, | |
| equivalent to | 9·01 | ... | ... | per pound, |
| ... | 4·19 | ... | sugar, | |

and estimating the quantity of blood in the human body at 24 pounds, by the first experiment we should have 61·68 grains in the sanguineous circulation, and by the second 100·56 grains. A pound of urine in diabetes I have found to contain 14·361 grains of sugar. Whether the sugar is burned in the lungs and capillaries, or is previously converted into fat by the agency of the casein of the blood, it remains of course to determine; but the experiments of Pelouze have shown us how this may be effected; and the present determinations seem to form a connecting link between starch and fat, which render the views of Liebig, in reference to the supply of animal fat being derived from starch, still more plausible than was at one time suspected.

The experiments detailed in this paper appear to lead to the following conclusions:—

1. That vegetable albuminous matter and fat when digested can be detected in the blood.

2. That if any free hydrochloric acid exist in the stomach of animals during the digestion of starch, the quantity must be so minute as to be scarcely appreciable.

3. That an acid exists in the stomach of animals fed on starch, which corresponds more nearly with lactic acid than with any other known acid.

4. That dextrin and soluble starch exist in the stomachs of animals which have been fed on farinaceous diet during and for some time after digestion.

5. That sugar exists in the blood of animals which have been fed on starch. And

Lastly, It is hoped they have in some measure contributed to throw a ray of light upon the important function which starch fulfils in the animal economy.

## MATERIA MEDICA AND CHEMICAL PHARMACY.

### *On the Proportion of Nitrogen contained in Alimentary Substances taken from both the Organic Kingdoms as a comparative measure of their Nutritive power.* By Dr J. Schlossberger and Alexander Kemp, Assistant Chemical teachers in the University of Edinburgh.

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* The results contained in this paper were communicated to Professor Liebig in September 1844. He then suggested the mode of detecting sugar by means of bile and sulphuric acid. I found this test to be ambiguous, as sulphuric acid alone produced a red colour in diabetic urine and in other animal fluids.

† Communicated by the Authors.

The distinction between the elements of the reproductive and those of the respiratory functions, is probably one of the most fertile ideas for which physiology is indebted to modern chemistry; even if we do not admit that division in its full extent, nevertheless we must allow it to be a beautifully conceived idea, and one founded on a great amount of observation. It may be assumed with safety that no other classification of the substances comprised under the vague designation of alimentary bodies, has in an equal degree represented the essential differences in their chemical composition and their physiological effects, or has presented to the eye of the mind the important part which these substances perform, as the above-mentioned distinction, which is also identical with that of *azotized* and *non-azotized* bodies.

In order to give some indication of the state of confusion which existed, even in this most elementary proposition of dietetics, previous to that distinction being made, it may not be more than necessary to mention the idea of that classical author, Dr Prout,* that the nutritive power is in direct proportion to the quantity of carbon. At the present day not a single fact is known which can support the idea of the animal body being able to form azotized from non-azotized substances,—possibly, under the influence of ammonia or of nitrogen from the atmosphere; on the contrary, all experiments, as well as daily observation, seem to prove the absolute necessity of azotized food for the preservation of the individual. Chemistry has likewise demonstrated the presence of a more or less high, but constant proportion of nitrogen in all the tissues and fluids of the animal body, while in all those substances which, according to our modern ideas, are the most nutritive, namely, the *proteine* compounds, the carbon is present in medium quantity. Those substances esteemed by Prout the most nourishing, because richest in carbon, as the fats and oils, must be altogether excluded from the list of reproductive bodies, except in so far as fatty matter is necessary to the formation of animal cells. The chemical physiologist could make use of the theory of Prout, in measuring the fitness of the bodies necessary to respiration, if along with the carbon could be taken into account the quantity of combustible or unoxidized hydrogen contained in them; but for those substances, which in the strict sense of the word are capable of being transformed into blood and animal tissue, according to our present knowledge, the capability for these purposes may be estimated relatively by the amount of nitrogen. This has been already done to a certain extent by the researches of several chemists and physiologists, but, so far as we are aware, it has been confined to vegetables; and it therefore appeared to us not to be without interest to make use of the same principle in extending the investigation to the various alimentary substances taken from the animal kingdom, and so to give to the physiologist a basis founded on facts in a department which has hitherto been so defective in the mysterious doctrine of nutrition.

Already Boussingault and Liebig have demonstrated, that in general the amount of proteine compound, and therefore that of nitrogen, is in a direct ratio to the phosphates; this proposition has as yet been extended only to vegetable matters, but will most probably preserve its value when applied likewise to those derived from animals. In so far as the nitrogen may be taken as an indication of the quantity of these salts, we could not find any observations as to how far it might be also applied to the gelatigenous compounds; and we have alluded to this as a very interesting field for future research, particularly with regard to the phosphate of lime, which seems so universal and so necessary to the whole animal œconomy.

It seems to be at present a proper time to overcome an objection, which, if not alluded to, might have been made against our attempt to determine the nutritive power of animal aliments; it is with regard to the delicate question of the use of animal gelatine, which seemed to Mulder, and likewise to us, as not at all decided by the experiments lately made at Paris. It is a fact sufficiently proved by the experiments of Magendie, Tiedemann, and Gmelin, that any substance, even the most nourishing, if very simple and used without admixture, cannot sustain animal life for any length of time; and if it was proved at Paris that dogs fed exclusively on gelatine perish, it is far from being just to conclude that the substance is not nutritive, as we should be compelled to apply the same rule to albumen and fibrine, by the exclusive use of which an animal would no less speedily perish. At all events gelatine has a high value as nutriment, if even that value arises alone from its being useful in the formation of gelatigenous tissues; in addition, the gelatigenous tissues, as well as those containing proteine, in regard to their formation and chemical constitution, seem to lie in close relation, although that relation is at present not perfectly understood.* The experience of our best physicians at the bedside of the patient tends to prove that during convalescence a well-prepared gelatinous diet, but not exclusively gelatinous, is highly nutritious.

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* See Mayo's Outlines of Human Physiology, p. 206, second edition. London, 1829.

All organic alimentary substances, as presented to us by nature, are mixtures, but seem to be pretty constant in their composition, although variously modified by our different modes of cooking them. Of such natural mixtures, the greater part taken from vegetable bodies have already had the proportion of nitrogen contained in them determined by previous observers; and we believe we shall best introduce the subject by a concise representation of that which has been done in regard to the vegetable part of our aliments, which will likewise afford the best means of comparing the results of our experiments on animal substances.

The following table shows the amount of nitrogen contained in 100 parts of the dry vegetable bodies named in it:—

| | | |
|---|---|---|
| Rice | 1·39 | Boussingault, *Economie Rurale.* Paris, 1844, tome 2me, p. 438. |
| Potatoes | 1·5 | |
| Turnips | 1·7 | |
| Rye | 1·7 | |
| Oats | 2·2 | |
| Wheat | 2·0 to 2·3 | |
| Carrots | 2·4 | |
| Barley | 2·0 | |
| Maize | 2·0 | |
| Peas | 3·8 | |
| Lentils | 4·4 | |
| Haricots | 4·5 | |
| Beans | 5·1 | |
| White bread | 2·27 | R. D. Thomson in the London and Edinburgh Philosophical Magazine for November 15, 1843. |
| Brown bread | 2·63 | |
| Glasgow unfermented bread | 2·14 | |
| Essex flour | 2·17 | |
| Canada flour | 2·21 | |
| Lothian flour | 1·96 | |
| United States flour | 1·82 | |
| Agaricus deliciosus | 4·6 | Schlossberger and Dœpping, Liebig's *Annalen* for October 1844, Chemical Gazette, July 1845. |
| " russula | 4·2 | |
| " cantharellus | 3·2 | |

Boussingault has calculated from the results of his experiments, that which he calls the equivalent nutritive powers of these substances for the domestic herbivorous animals, and Thomson has also given one for those bodies which he examined. We omit these tables, as we have the intention of constructing a table of our own for all the substances which are used as food by man, and which have been hitherto examined in this respect.

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* See Mulder's Chemistry of Animal and Vegetable Physiology, translated by Fromberg, 319 and following pages.

We may now proceed to the relation of our experiments. All the substances made the subject of observation were first carefully dried at 212° F., and then analysed according to the method of Varentrapp and Will, slightly modified to overcome some practical difficulties.

Intermediate between animal and vegetable aliment, as daily observation teaches and chemical analysis confirms, is to be found the most general food of the young of the class mammalia, namely, milk.

I. Cow's milk. 0·404 gramme* of the dried residue, obtained by evaporating the fresh drawn milk in the water-bath and subsequent desiccation at 212° F., yielded 0.241 grm. of the ammonio-chloride of platinum, corresponding to 3·78 per cent. of nitrogen.

II. 0·438 grm. human milk, treated as in the first experiment, gave 0·11 grm. ammonio-chloride of platinum, equal to 1·59 per cent. of nitrogen.

Human milk is, according to most analyses, one of the poorest in caseine, and in this respect is very far inferior to that of the cow, but in consequence of this may probably be more easily digested. The amount of nitrogen in milk, which corresponds to that of caseine, comes much nearer to the proportion contained in vegetables than any other kind of aliment from the animal kingdom.

Of the substances obtained from milk and used as food, we have examined only that of cheese, selecting four of the kinds most commonly used in Britain.

III. 0·485 grm. of Dunlop cheese gave 0·461 grm. of ammonio-chloride of platinum, equal to 6·03 per cent. of nitrogen.

IV. 0·475 grm. of Gouda cheese gave 0.532 grm. of ammonio-chloride of platinum, equal to 7·11 per cent. of nitrogen.

V. 0·444 grm. of Cheshire cheese gave 0·471 grm. of ammonio-chloride of platinum, equal to 6·75 per cent. of nitrogen.

VI. 0·477 grm. of double Gloucester cheese gave 0·525 grm. of ammonio-chloride of platinum, equal to 6·98 per cent. of nitrogen.

VII. 0·557 grm. of a very old double Gloucester cheese, abounding in mites and mould, in the condition in which it is sought after to gratify the depraved taste of the epicure, gave 0·463 grm. of ammonio-chloride of platinum, equal to 5·27 per cent. of nitrogen.

We add here, as being similar in composition, the yolk of the egg of the common fowl.

VIII. 0·526 grm. of well-dried yolk gave 0·387 grm. of ammonio-chloride of platinum, equal to 4·86 per cent. of nitrogen.

Somewhat more nutritive than milk, and more nearly allied to cheese, is a series of bodies obtained from the lower orders of the animal kingdom. We give here, as examples, the oyster and one or two others.

IX. 0·418 grm. of the oyster, *Ostrea edulis*, gave 0·346 grm. of ammonio-chloride of platinum, equal to 5·25 per cent. of nitrogen.

As this seemed to us a very low result, we repeated our analysis, which, however, confirmed our first experiment; in this case 0·354 grm. giving 0·283 grm. of ammonio-chloride of platinum, equal to 5·07 per cent. of nitrogen.

X. 0·354 grm. of the yellow matter (liver and bile) from the crabfish, *Cancera communis*, gave 0·418 grm. of ammonio-chloride of platinum, equal to 7·52 per cent. of nitrogen.

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* The balance used in these analyses having been made by Deleuil of Paris, and being only furnished with French weights, will account for the introduction of the word here, and in the other analyses throughout the paper. The French gramme is equal to 15.444 English grains.

XI. 0·377 grm. of the common mussel, *Mytilus edulis*, gave 0·498 grm. of ammonio-chloride of platinum, equal to 8·41 per cent. of nitrogen.

XII. 0·308 grm. of the above animal, previously boiled, gave 0·510 grm. of ammonio-chloride of platinum, equal to 10·51 per cent. of nitrogen.

We find that many of the organs of the higher animals, for example, the liver of the ox, nearly agree in the amount of nitrogen with those substances we have just treated of.

XIII. 0·432 grm. of ox liver gave 0·726 grm. of ammonio-chloride of platinum, equal to 10·66 per cent. of nitrogen.

XIV. 0·419 grm. of the liver of the pigeon gave 0·778 grm. of ammonio-chloride of platinum, equal to 11·80 per cent. of nitrogen.

For the reason just mentioned, we here likewise notice the analysis of the muscles of some kinds of fish, which, from being quite saturated with oil, give a low amount of nitrogen; for instance, that of the eel containing 6·91 per cent., and pork ham, from the large quantity of salt, giving only 8·57 per cent.; but we shall return to these more in detail. The connecting link between the two extremities of the nutritive scale of animal aliments we have formed, appears to be the dried extract of meat, which is sold under the name of portable soup or *bouillon*.

XV. 0·441 grm. of portable soup, of an excellent quality, gave 0·845 grm. of ammonio-chloride of platinum, equal to 12·16 per cent. of nitrogen. Osmazome is therefore a body rich in nitrogen, probably from containing oxide of proteine, and perhaps also kreatine.

We shall give our results on the different kinds of flesh, including that of the fishes also, with which we begin.

Common eel, *Anguilla vulgaris*.—The flesh of this fish is poorer in nitrogen than any of the others which we have examined; in consequence of the large quantity of fat or oil it contains; indeed, during the whole desiccation it was floating in a liquid fat.

XVI. 0·345 grm. of raw eel's flesh gave 8·379 grm. of ammonio-chloride of platinum, equal to 6·91 per cent. of nitrogen.

XVII. 0·306 grm. of boiled eel's flesh gave 0·329 grm. of ammonio-chloride of platinum, equal to 6·82 per cent. of nitrogen.

XVIII. 0·293 grm. of eel's flesh, which had been previously washed with distilled water, and afterwards boiled in alcohol as long as any matter separated, yielded 0·667 grm. of ammonio-chloride of platinum, equal to 14·45 per cent. of nitrogen, a quantity as great as that from the higher animals.

XIX. 0·274 grm. of the flesh of the salmon, *Salmo Fario*, gave 0·533 grm. of ammonio-chloride of platinum, equal to 12·35 per cent. of nitrogen.

XX. 0·286 grm. of boiled salmon gave 0·437 grm. of ammonio-chloride of platinum, equal to 9·70 per cent. of nitrogen.

XXI. 0·319 grm of the purified muscular fibre of the salmon gave 0·785 grm. of ammonio-chloride of platinum, equal to 15·62 per cent. of nitrogen.

XXII. 0·271 grm. of the raw herring, *Clupea Harengus*, gave 0·590 grm. of ammonio-chloride of platinum, equal to 14·48 per cent. of nitrogen.

XXIII. 0·314 grm. of boiled herring gave 0·636 grm. of ammonio-chloride of platinum, equal to 12·85 per cent. of nitrogen.

XXIV. 0·350 grm. of purified muscle of the herring gave 0·802 grm. of ammonio-chloride of platinum, equal to 14·54 per cent. of nitrogen.

XXV. 0·4065 grm. of the milt of the herring gave 0·940 grm. of ammonio-chloride of platinum, equal to 14·69 per cent. of nitrogen. This substance is therefore as nutritive as the muscular parts of the fish, containing the same amount of nitrogen.

XXVI. 0·316 grm. of the flesh of the haddock, *Æglefinus communis*, gave 0·729 grm. of ammonio-chloride of platinum, equal to 14·64 per cent. of nitrogen.

XXVII. 0·331 grm. of boiled haddock gave 0·677 grm. of ammonio-chloride of platinum, equal to 12·98 per cent. of nitrogen. Whereas in the case of the herring, salmon, haddock, and eel, the proportion of nitrogen was considerably diminished by boiling the flesh for about half an hour, the reverse of this occurred in some of the other cases; for example, in the mussel, the flesh of the ox and calf. These are mere observations of facts, arising probably from accidental causes: the modification which meat undergoes by boiling not being sufficiently understood by chemists at present, although Mulder has proved the formation of oxide of proteine by it; from the observations just made, no general conclusion can be drawn, because they do not seem to coincide, at least at first sight.

XXVIII. 0·271 grm. of the purified muscle of the haddock, gave 0·671 grm. of ammonio-chloride of platinum, equal to 15·72 per cent. of nitrogen.

XXIX. 0·348 grm. of the flesh of the flounder, *Platessa Flessus*, gave 0·783 grm. of ammonio-chloride of platinum, equal to 14·28 per cent. of nitrogen.

XXX. 0·342 grm. of boiled flounder gave 0·818 grm. of ammonio-chloride of platinum, equal to 15·18 per cent. of nitrogen.

XXXI. 0·301 grm. of purified muscle of the flounder gave 0·745 grm. of ammonio-chloride of platinum, equal to 15·71 per cent. of nitrogen.

We have selected the skate, *Raia Batis*, as a fair example of the cartilaginous order of fishes.

XXXII. 0·415 grm. of the flesh of the skate gave 1·066 grm. of ammonio-chloride of platinum, equal to 15·39 per cent. of nitrogen.

XXXIII. 0·402 grm. of boiled skate gave 0·964 grm. of ammonio-chloride of platinum, equal to 15·22 per cent. of nitrogen.

XXXIV. 0·407 grm. of the boiled muscle taken from the claw of the crabfish gave 0·877 grm. of ammonio-chloride of platinum, equal to 13·66 per cent. of nitrogen. From this analysis we are led to believe that the muscles of the *Crustacea* are as rich in nitrogen as those of much more highly organised animals.

XXXV. 0·299 grm. of the flesh of the pigeon gave 0·570 grm. of ammonio-chloride of platinum, equal to 12·15 per cent. of nitrogen. This is a surprisingly low number, more especially as the muscle of this bird was nearly free of fat.

XXXVI. 0·334 grm. of boiled pigeon gave 0·649 grm. of ammonio-chloride of platinum, equal to 12·33 per cent. of nitrogen.

XXXVII. 0·166 grm. of the purified muscle of the pigeon gave 0·344 grm. of ammonio-chloride of platinum, equal to 13·15 per cent. of nitrogen. The fibre used in this experiment most tenaciously retained a small quantity of the colouring matter of the blood. We have already given the analysis of the liver of this bird (experiment XIV.)

XXXVIII. 0·347 grm. of lamb gave 0·725 grm. of ammonio-chloride of platinum, equal to 13·26 per cent. of nitrogen.

XXXIX. 0·320 grm. of the purified fibre of lamb gave 0·734 grm. of ammonio-chloride of platinum, equal to 14·56 per cent. of nitrogen.

XL. 0·336 grm. of mutton gave 0·651 grm. of ammonio-chloride of platinum, equal to 12·30 per cent of nitrogen. In this case it was found extremely difficult to separate mechanically the whole of the fat; it is necessary to notice this, as the numbers are somewhat lower than might have been expected.

XLI. 0·341 grm. of boiled mutton gave 0·728 grm. of ammonio-chloride of platinum, equal to 13·55 per cent. of nitrogen.

XLII. 0·335 grm. of the purified fibre from mutton gave 0·779 grm. of ammonio-chloride of platinum, equal to 14·76 per cent. of nitrogen.

XLIII. 0·318 grm. of veal gave 0·696 grm. of ammonio-chloride of platinum, equal to 13·89 per cent. of nitrogen.

XLIV. 0·379 grm. of boiled veal gave 0·866 grm. of ammonio-chloride of platinum, equal to 14.50 per cent. of nitrogen.

XLV. 0·214 grm. of purified fibre from veal gave 0·532 grm. of ammonio-chloride of platinum, equal to 15·78 per cent. of nitrogen.

XLVI. 0·306 grm. of ox-beef gave 0·675 grm. of ammonio-chloride of platinum, equal to 14·00 per cent. of nitrogen.

XLVII. Last experiment repeated. 0·292 grm. gave 0·633 grm. of ammonio-chloride of platinum, equal to 13·73 per cent. of nitrogen.

XLVIII. 0·331 grm. of boiled beef gave 0·781 grm. of ammonio-chloride of platinum, equal to 14·98 per cent. of nitrogen.

XLIX. 0·392 grm. of purified fibre of beef gave 0·919 grm. of ammonio-chloride of platinum, equal to 14·88 per cent. of nitrogen. The liver of the ox gave 10·66 per cent. of nitogen (see XIII.)

L. 0·216 grm. of the lungs of the ox gave 0.504 grm. of ammonio-chloride of platinum, equal to 14·81 per cent. of nitrogen.

LI. 0·359 grm. of pork-ham gave 0.485 grm. of ammonio-chloride of platinum, equal to 87 per cent. of nitrogen.

LII. 0·395 grm. of the boiled pork-ham gave 0.777 grm. of ammonio-chloride of platinum, equal to 12.48 per cent. of nitrogen.

LIII. 0·384 grm. of the purified fibre of pork-ham gave 0·868 grm. of ammonio-chloride of platinum, equal to 14·21 per cent. of nitrogen.

We regret that at the time when these experiments were made, we were unable to procure fresh pork, but we thought that an examination of the salted and smoked substance would not be devoid of interest.

From these results we see that there is no appreciable change produced in the composition of the fibre by the preparation and length of time it had been kept; if, however, we take equal weights of the prepared ham and of the fresh flesh of the sow, we shall of course find a considerable difference in the amount of nitrogen from the large quantity of salt which is present in the prepared ham. We conclude this account of our experiments by giving the analysis of the white of the egg of the barn-door fowl.

LIV. 0.369 grm. of the white of the egg gave 0·781 grm. of ammonio-chloride of platinum, equal to 13·44 per cent. of nitrogen. The quantity of nitrogen in pure albumen, as determined by Mulder, is 15·8 per cent.

We take the liberty to add to these experiments the following remarks; —The proportion of nitrogen in purified muscular fibre seems to be identical, from whatever part of the animal kingdom it may be obtained; and the differences given by the results of analysis may be fully explained by the difficulty, or even impossibility, of analysing it in an equally pure or impure condition, as obtained from different animals, in which it is always mixed with cellular tissue, minute vessels, and nerves. Moreover, it is extremely difficult to get rid of traces of fat and hematine.

That the chemical properties of muscular fibre in the whole animal kingdom are identical, one of us endeavoured to prove in a former research (Schlossberger, *Vergleichende Untersuchungen uber das Fleisch verschiedener Thiere.* Stuttgardt, 1840). In contradiction to a very generally-received opinion, it appears to us that the muscles of fish are as rich in nitrogen as those of higher animals; at first sight, however, owing to the presence of a greater quantity of water, and in some fishes, as the eel, to a difficultly separable fat, its amount appears very much lower. Further, as the proximate principles are essentially the same in both classes of animals, it seems to us that they should be equally nutritive, although this proposition is also directly opposed to another very general prejudice. According to our scale, the oyster does not seem nearly so nourishing as it is generally reputed to be by common opinion, although it is possible that the proteine compounds in the lower classes of animals may be found to be much richer in phosphorus, in sulphur, and in phosphates than in the higher. Should this prove to be the case, we can see, that although the proportion of nitrogen may not be so great, nevertheless that they might act more powerfully as *stimulants*, which, as regards the oyster, is believed by some of our best physicians. We intend in a future series of experiments to direct our attention to this part of the subject.

In order that our views on this subject should not be misunderstood, it is necessary for us so state, that we do not consider the proportion of nitrogen, taken alone, to be an absolute measure of the nutritive power of our aliments; but as there is a total want of any positive data in regard to this subject and as so many different and contradictory opinions are given in the works on dietetics,* it must be granted that any attempt to fix a standard for comparison is not without interest.

With respect to the capability for nutrition, we are far from denying that the physical condition, the state of admixture, the peculiar kind of proteine compound, the amount of water and other inorganic matters, of fat, and lastly, the effects of cookery, must necessarily have a very great influence on the physiological effects of our aliments.

There is one consideration in particular which requires to be noticed, namely the distinction between the absolute amount of the nutritive matter, and that portion of it which is in such a state as to be easily digested and assimilated by the system, in the same way as a soil produced from minerals abounding in alkaline salts is not always the most fertile as regards plants with a predominance of alkaline bases, but the fertility of which depends on the amount of these bodies contained in a state in which they can be taken up and made use of by the plant. Thus an aliment abounding in nutritive matter may be inferior to one with a much smaller quantity as regards the nourishing effects produced by it; if in the first of these cases only a part, in the second the whole may be easily absorbed and assimilated. Here we must rely upon the experiments of the physiologist as to the degree of digestibility of different substances; and there already exists an excellent basis in the researches of Beaumont and of Blondlot. This is one of the questions, in which, by the co-operation alone of the physiologist and chemist, any progress can be expected to be made in the elucidation of this point. If the work were once fairly begun by the physiologist, chemistry would not be long in rendering that assistance which would then be found necessary; for example, in the various experiments which might be made in artificial digestion, from the results of which as one element in the calculation taken along with the proportion of nitrogen as the other, it would at once be possible to determine scientifically the real nutritive value of the different kinds of aliment; the importance to our dietetics of this method of determination, which at present exists only in idea, would then not only be felt by the patient, but by the whole human race.

Table of the comparative proportion of nutriment in our organic aliments. If we assume the amount of nitrogen in human milk, perfectly dried at 212° F., to be represented by 100, we can then express the degree of nutritive power of the other alimentary substances by the following numbers:—

| *Vegetable.* | | Maize | 100 to 125 |
|---|---|---|---|
| Rice | 81 | Barley | 125 |
| Potatoes | 84 | Unfermented bread of Glasgow | 134 |
| Turnips | 106 | Oats | 138 |
| Rye | 106 | White bread | 142 |

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* See all works from Plenk's *Bromatologia* to the latest, as Paris's Treatise on Diet, as well as our standard works on Materia Medica, and we think it will be allowed that we have not asserted too much.

| | |
|---|---|
| Wheat | 119 to 144 |
| Carrots | 150 |
| Brown bread | 166 |
| Agaricus cantharellus | 201 |
| Peas | 239 |
| Agaricus russula | 264 |
| Lentils | 276 |
| Haricot beans | 283 |
| Agaricus deliciosus | 289 |
| Beans | 320 |
| *Animal.* | |
| Human milk | 100 |
| Cow's milk | 237 |
| Oyster | 305 |
| Yolk of egg | 305 |
| Cheese | 331 to 447 |
| Eel, raw | 434 |
| " boiled | 428 |
| Liver of crabfish | 471 |
| Mussel, raw | 528 |
| " boiled | 660 |
| Ox-liver, raw | 570 |
| Pork-ham, raw | 539 |
| " boiled | 807 |
| Salmon, raw | 776 |
| " boiled | 610 |
| Liver of pigeon | 742 |
| Portable soup | 764 |
| White of egg | 845 |
| Crabfish, boiled | 859 |
| Skate, raw | 859 |
| Skate, boiled | 956 |
| Herring, raw | 910 |
| " boiled | 808 |
| " milt of | 924 |
| Haddock, raw | 920 |
| Haddock, boiled | 816 |
| Flounder, raw | 898 |
| " boiled | 954 |
| Pigeon, raw | 756 |
| " boiled | 827 |
| Lamb, raw | 833 |
| Mutton, raw | 773 |
| " boiled | 852 |
| Veal, raw | 873 |
| " boiled | 911 |
| Beef, raw | 880 |
| " boiled | 942 |
| Ox-lung | 931 |
| *Purified muscular fibre from various animals.* | |
| Fibre of eel | 908 |
| " salmon | 982 |
| " herring | 914 |
| " haddock | 988 |
| " flounder | 988 |
| " pigeon | 775 |
| " lamb | 916 |
| " sheep | 928 |
| " calf | 993 |
| " ox | 935 |
| " sow | 893 |
| *Proximate principles of animals calculated from the quantity of nitrogen as determined by Mulder.* | |
| Pure proteine | 1006 |
| " albumen | 996 |
| " fibrine | 999 |
| " caseine | 1003 |
| " gelatine | 1128 |
| " chondrine | 910 |

*Analysis of the Hill Opium of India.** By S. Fourmy Thomson, M.D., Chemical Assistant in the University of St Andrews; Corresponding Mem. Glasgow College Medico-Chirurg. Society; Author of the Companion to the Pharmacopœia, &c. *(Communicated by the Author.)*—I received from my friend, Dr J. S. Sutherland, of the Bengal Medical Establishment, a small quantity of a drug, the product of India, and called "Hill Opium." It was of a consistence as hard as bees-wax; of a dark-brown colour; a bitter, somewhat spicy, not disagreeable taste; an aromatic opiate odour; a somewhat shining and homogeneous fracture. Being requested to ascertain the proportions of morphia and narcotina in the specimen, I subjected it to a variety of processes which gave evidence that it contains the following proximate principles, characteristic of opium, viz.:—morphia, codeina, narcotina, and meconic acid. When the opium had been exhausted, first by distilled water, and then by dilute acetic acid, the insoluble residuum amounted only to about 17 per cent. and the ash to 3·3. The morphia was estimated both by the process of Gregory, and by that of Mohr; and the narcotina was also ascertained in two different ways.

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* "This drug has probably never reached this country before. * * * The localities where this opium is an object of cultivation, are those ranges of the Himala varying from six to eight thousand feet above the level of the sea. The plant is cultivated in little terraces or hanging gardens, watered by rills from the precipices above, and guided in tiny canals, such as are cut for rice growing. The soil consists of debris or detritus from the overhanging mountains, and the enormous quantity of micaceous schist that assist in the formation of these mountain ranges, may form a soil specifically affecting the product. Besides the supply of this drug, necessary for the demand among the hill population, certain causes exist for the supposition that a contraband exportation of it is carried on towards Scinde by the Sutlej, and also by the Sirsa and Bahawulpoor countries. This was stated to me by a European trader, whose various avocations and vicissitudes had rendered him likely to be possessed of some knowledge of the circumstance. But there is no reason to think that any quantity reaches the British provinces, probably from its superior qualities being as yet unknown. * * * From the analysis, it would appear that the value of the drug consists in the presence of rather more than the average proportion of morphia, and greatly less than the average quantity of narcotina, which agrees with the medical effects noticed."—See Dr Sutherland, in Northern Journal of Medicine, Jan. 1846, p. 8.

I.—*Estimation of the Morphia.*—1. By the well-known method of Dr William Gregory, I obtained from 50 grains of the opium, gr. 4·7 of the common muriate of morphia, or 9·4 per cent., which indicates nearly 7 per cent. of pure morphia. From this muriate I procured a minute quantity of codeina. The precipitated morphia was turned red by nitric acid, and blue by sesquichloride of iron. The infusion and the precipitated salt of lime were coloured blood-red by sulphated peroxide of iron, which is the property of meconic acid.

2. Seventy-five grains of the opium were, in the next place, treated according to the process of Mohr. It was digested with successive portions of distilled water; first, for 48 hours, and then for 36, and 24 hours at a time—the infusion being always well expressed from the residuum. The liquid being brought a-boil, was poured into boiling hot milk of lime, containing twenty grains of the caustic earth; and when it had boiled a little while, it was filtered, evaporated down, and boiled with sal-ammoniac, as long as odours of ammonia escaped. The precipitated morphia being washed and dried was almost colourless, and weighed altogether gr. 6·675, which is 8·9 per cent. In was entirely soluble in oxalic acid, and was rendered blue by sesquichloride of iron, and red by aquafortis.

From these two separate processes, it is to be concluded that the opium contains not less than from 7½ to 8 per cent. of this alkaloid, and therefore that a pound weight (avoirdupois) would yield nearly 13 drachms (apoth.) of good muriate of morphia.

II.—*Estimation of the Narcotina.*—1. Fifty grains of the opium, dried and pulverized, were digested for two days in half a fluid-ounce of ether, with the aid of a gentle heat. The solution was then poured off, and the mass being dried and powdered again, the digestion was repeated twice more, for a day each time, with fresh ether. The residuum was then washed with ether, and the whole solution evaporated nearly to solidity, and till it had no etherial odour. This extract was of a dark-brown colour, and it reddened litmus paper. On treating it with warm and weak muriatic acid, a reddish solution was obtained, and a tough dark-grey residuum, insoluble in water, and of the characters of caoutchouc. In the next place, the solution was boiled with animal charcoal, filtered, and precipitated with excess of ammonia. The light-grey precipitate thus obtained being heated in alcohol, some black matter was left undissolved, and the crystals of narcotina weighed gr. 0·85, or 1·7 for 100 parts of the opium.

2. The residuum of the opium from process I., 2. was digested for some days in dilute acetic acid, with the aid of a gentle heat, and the filtered infusion treated with ammonia in surplus. The black agglutinated precipitate was redissolved in acetic acid; its solution clarified by animal charcoal; and when the treatment with volatile alkali had been repeated, the washed precipitate weighed gr. 1·2. Being of a grey colour, it was doubt-

less mixed with some colouring matter, so that the result of this second experiment confirms the preceding, to the effect that the opium contains but a small per-centage of narcotina.

It is not indeed to be relied upon as determining the real amount of narcotina, for we know that some of this alkaloid comes away by the maceration in water for morphia; but as the greater part of it is left in the residuum, we may justly regard the obtaining so large a quantity as gr. 1·2 (impure), from the solid remains of 75 grains of the opium, a proof of the correctness of the former estimation by ether, which is the proper menstruum for narcotina. In regard to the morphia, the estimation by process No. 2 must be considerably nearer the truth than the first trial, in consequence of the greater security against loss in the prompt method of Mohr. In proceeding with No. 1, I had such a multitude of manipulations, as inevitably to cause serious diminution of the product. However, in the following comparison of the hill opium with those of Turkey and Egypt, which were analysed by Muller and Schindler, we shall take the morphia at 7·95 per cent. the mean between our two experiments.

| | Morphia, per cent. | Narcotina, per cent. |
|---|---|---|
| Hill opium | 7·95 | 1·70 |
| Smyrna opium, (best sp.) | 10·84 | 6·80 |
| Ditto | 9·85 | 9·36 |
| Ditto | 10·30 | 1·30 |
| Egyptian opium | 7·00 | 2·68 |

## MEDICAL PATHOLOGY.

*Account of Dry Gangrene from the use of Spurred Rye.* By **Frederick Tiedemann**, Professor of Anatomy and Physiology at Heidelberg. (*On Arctation and Closure of Arteries.* Second Part. Second Section. Chapter IV. p. 273)—In the year 1630 dry gangrene appeared in several provinces of the south of France. Perrault informed the French Academy that in a journey undertaken in 1672 into Sologne, a noted district for the prevalence of the disorder, he had seen several persons with gangrenous extremities. Dodart communicated reports on the gangrene which prevailed in the district of Montargis in the year 1674. It was preceded by numbness in the limbs; which then became painful and sometimes swelled, without presenting, however, any external phenomena of inflammation. Gradually the skin became cold and of a dark-blue colour; the limbs lost altogether their sensibility, died, were shrivelled and became hard like wood. In many cases the affection was accompanied with malignant fever and delirium. Thuillier attributed the occurrence of this sort of gangrene to the use of spurred rye, which in the moist year had been abundant in the crops. Many cases of this gangrene Saviard observed in the year 1694 in the Hotel Dieu at Orleans. Both superior and inferior extremities became mummified and perished.

At the beginning of the eighteenth century this form of gangrene was observed in the Schwarzwald by Conrad Brunner and Rudolph Jakob Kammerer. In the years 1709 and 1710, when failure of the crops took place, an epidemic of gangrene raged at Orleans and Blesois. Noel, surgeon at the Hotel Dieu at Orleans, treated more than fifty patients, adults and children, who suffered from dry gangrene. The disease uniformly commenced on the toes, which became black and dry, and then spread over the foot and leg, sometimes to the thigh. In one patient only was the gangrene found in the hand. Several patients lost gangrenous limbs. Four or five patients on whom amputation was performed, died in consequence of the gangrene attacking the stump.

In the year 1709 dry gangrene appeared in the Canton of Lucerne; and in the years 1715 and 1716 it was observed in Zurich and Bern. According to Lang, the disease began with great weakness, without febrile action.

Then great coldness took place in the extremities, which became numb, pale, and wrinkled, and lost their sensibility. In the interior of the limbs the patients felt pricking pains, which were aggravated by external warmth. Then the toes or fingers became black, dry, and gangrenous; and the gangrene spread to the foot, leg and thigh, or the hand, forearm, and arm, which dropped off. Then arose fever, profuse sweating, disturbed sleep, and death followed.

Du Hamel has described a gangrenous epidemic in Sologne in the year 1747, immediately after harvest; and in which the upper and lower extremities dropped off without hemorrhage. Salerne, a physician at Orleans, presented to the French Academy a report on the gangrenous epidemic prevailing at Orleans in the same year, which was caused by spurred rye. One half more males were attacked than females. The mummy-like dried limbs dropped off. He saw a child of ten years in whom the gangrened lower extremities dropped off from the *acetabulum*. His brother, aged 14, lost the leg and thigh of one side, and the leg of the other side. Both died twenty-eight days after the commencement of the disease. All in whom amputation was performed in the living parts, five or six inches above the gangrened parts, died, and indeed sooner than those in whom the operation had not been performed. Of more than 120 patients not more than four or five remained alive.

In the month of August 1764 the dry gangrene caused great ravages in the district of Arras and Douai. The disease evinced itself according to Read by very violent pains in the limbs with some swelling, yet without manifest inflammation of the skin, but with fever. This state continued from ten to fifteen days. Then in general the pains ceased, and there followed numbness in the feet or hands, with great coldness. This lasted from eight to ten days. In the third period appeared *phlyctaenae*, and the toes or fingers were mortified. The gangrene made rapid progress, and the limbs usually separated at the joints. The powers of the patients speedily failed, and death followed.

That this species of mortification really is caused by the use of bread which contains spurred rye, which many physicians have long doubted, was proved by the experiments of Thuillier, Salerne, and Tessier on living animals, which were fed on spurred rye, and to which these animals evinced a great dislike. In these animals gangrene attacked the feet and ears, which then dropped off. Gangrenous spots were found also in the bowels and on the liver.

On the condition of the blood-vessels in the bodies of persons who have died of this sort of dry gangrene, there are unfortunately no anatomical researches; and hence on the detrimental effects of the spurred rye we are confined to conjectures alone. Some sought for the cause in an altered morbid condition of the blood, because Salerne found the blood drawn from the veins dark-red in colour, viscid, and very tough. Tissot thought that spurred rye caused, by means of nervous irritation, a spasmodic contraction and closure of the arteries. Thomson considered the impediment to the motion of the blood to the parts as the cause of gangrene. Roche asserts that spurred rye excites inflammation of the arteries, and causes thereby obliteration of the arteries and gangrene. When we compare the symptoms which follow the use of spurred rye with those which take place in connection with *arteritis*, there is a surprising resemblance to them, which cannot be mistaken, and it is a probable conjecture that spurred rye causes gangrene by inducing acute inflammation and closure of the arteries.

These pernicious effects of spurred rye must, in my opinion, require care in the use of the same as a therapeutic agent, and render great precaution necessary. Oliver Prescot first used spurred rye as a means of exciting powerful contraction of the womb in labour. It has also been employed against uterine hemorrhage. In later times it has been regarded as a specific excitant of the spinal marrow. Payen used this agent in palsy of the lower extremities and in *ischuria paralytica*; and J. B. Thomson employed it in chorea and the *paralysis tremens* of old age. Bonjean has given a chemical analysis of spurred rye; from which it appears that it contains a yellow coloured sharp-tasted oil, which is soluble in cold water and in boiling alcohol, and is highly poisonous. There is also found in it an extractive matter, which may be diffused in boiling water, brown, consistent, and of a heavy odour; but which is not at all poisonous.

### MEDICAL TOPOGRAPHY AND STATISTICS.

*Investigation directed by Government to be made into the Nature and Causes of the Fever which affected the crew of the Eclair, at the Island of Buena Vista.*—The profession will be happy to learn that Dr J. O. M'William, the able and intelligent surgeon of the Albert, and the author of the account of the Niger expedition, has been directed by Government to proceed in the Rapid to Buena Vista, in order to inquire into the circumstances under which the crew of the Eclair, when landed at that island, were attacked by fever. It will be remembered that the Eclair arrived at the island of Buena Vista on the 21st August 1845; that permission was obtained to land the crew on the island; that a fort was appropriated to the accommodation of the seamen sick and unaffected; and that the officers were accommodated in lodgings in the town.

It is said that after this the disease continued to spread; that several of those hitherto well became ill; and that thirty-one persons died between the 21st of August and the 13th September.

Now the number of those attacked at Buena Vista may have either depended on the imbibition and absorption of the original miasmatic poison on the coast of Africa, or it may have arisen from miasma or malaria at Buena Vista.

This will form one of the points to which Dr M'William will direct his attention; and we have no doubt that he will conduct the inquiry with that acuteness and impartiality which we know belong to his character as a medical observer.

We are further informed that Dr M'William may proceed, if he sees proper, to the coast of Africa. Dr M'William sailed from Plymouth in the Rapid on the 12th February.

Meanwhile, as the island of Buena Vista, which has acquired such an unhappy celebrity in this matter, appears to be very little known, we think it may not be improper to subjoin some short notice of it, taken from those who have visited it and the other Cape Verd Islands at different periods; and though these notices are from their nature not recent, and indeed it is not easy to obtain recent information regarding a place hitherto so insignificant and so little visited, yet they may be better than no information at all.

The island of Buona Vista or Buena Vista is one of the Cape Verd Islands, and lies in 16° 6 north latitude, longitude, 22° 47 west from Greenwich.

Of the islands of Cape de Verd, three were discovered in the year 1449 by a Portuguese captain in the reign of the Infant Don Henry. In 1446 Nuno Tristan had doubled Cape Verd itself in the latitude of 14° 40′. In the spring of 1448 Don Gonzalo Vallo sailed to the islands, then first called the Açorres, or Hawk Islands, from the word Açor, which, in Spanish, signifies a Hawk. And in the following year one of the Cape de Verd Islands was discovered on May day, and was accordingly named Ilha de Maio; and at the same time were discovered other two islands, on which the Portuguese adventurers, like good Catholics, bestowed the names of St Jago and St Philippo. It seems by some accounts to have been 1460 before the others of this group of islands were discovered; and probably the whole were not even then discovered; for Clipperton, who visited them in the year 1719 in February, states that they were discovered in 1572, a full century after the time at which they are said by others to have been visited by the Portuguese navigators. This was most likely occasioned by their lying a good deal apart, and extending over a large space of the Atlantic, about 90 leagues, or 270 miles.

Cape de Verd is a large mountainous promontory, situate on the west coast of Africa, in latitude 14° 30′, between the rivers Senegal and Gambia. It is supposed to be the same promontory which is called by Ptolemy Arlinarium, but placed by him erroneously in 10° 40′ north latitude. For its name Cape de Verd, or Cape Verd, different reasons are assigned; one party saying that it was so named from the many trees near it, and their constant verdure; and another, that it was thus known because the sea in the neighbourhood for a long distance outward is covered by the green floating production called *Fucus natans*, or Sargasso by the Portuguese, which indeed gives the Atlantic in this region the appearance of being covered with green grass.

Nearly opposite to the Cape lie the Cape Verd Islands, the nearest at the distance of seventy leagues, or 210 miles; the most remote at the distance of 160 leagues, or 480 miles, so that from the nearest to the most distant a space is included equivalent to 90 leagues, or 270 miles. This space, in which these islands are placed, extends from the 14½° or 15° of north latitude to the 19°. It is in this space, and to the 24° north latitude that the Sargasso is found, and it is said to be so abundant as to cause sensible resistance to the motion of ships. Yet it is remarkable that navigators have generally asserted that here soundings are not to be obtained.

The Cape de Verd Islands are in number ten, viz. St Jago, St Lucia, St Vincent, St Antonio, St Nicholas, Ilha Blanco, or White Island, Ilha de Sal or Salt Island, Ilha de Maio, May Island, Ilha de Fogo, or Fuego, Fire Island, and Ilha de Bona Vista, or Buona Vista, or Fine View Island.

According to the account of Sir Francis Drake, who visited them in 1577 or rather January 1578, the salt found there so abundantly is made by the heat of the sun acting on the lagoons and bays of salt-water; and he says the people have only to gather it in heaps and sell it to their neighbours, which they do with great profit.

Jacques le Hermite, who visited them in 1623, says that bloody flux attacked his seamen; and that afterwards, in consequence of continual rain and the bad water, an epidemic arose which carried off abundance of people.

The formation of salt by spontaneous evaporation on the coast and bays is confirmed by Dampier.

Captain Woodes Rogers, who visited these islands in 1708, gives the following account.

The island of St Vincent, which he first visited, is mountainous and barren; the plainest part lies against the sandy bay where we rode. The wood is short, and fit for no other use but firing. They have very large spiders here, which weave webs so strong between the trees that it is difficult to get through them. Where we watered there is a little stream that flows down the hill from a spring and is very good; but in other parts it is brackish. The island was formerly inhabited and had a governor; but it is now only frequented in the season for catching tortoises by the inhabitants of the other islands, who are for the most part negroes and mulattos and very poor. The stock of wild goats on this island is almost destroyed by the people of St Nicholas and St Antonio. The heats were excessive to us who came newly from Europe, so that several of our men began to be sick, and were blooded. (This was between the 1st and 8th of October 1708. It was evidently the usual autumnal fever of the islands.)

From the voyage of Captain Beckman to Borneo in 1714, first published in 1718, the following statements are given.

The island of St Jago is the largest of all; being in length about 45 leagues, in breadth 10, and in circuit 95.

St Nicholas and St Lucia are each in length about 25 or 26 leagues, in breadth about 7 or 8, and 60 in circuit. The air in general is *unwholesome;* the soil of some is stony and barren, as particularly that of Sal, Bona Vista, and Mayo. The first (Sal) has a great number of wild horses, as also the last; but besides it has a much greater multitude of wild goats, and such a prodigious quantity of salt, that it could load, as is reported, about 2000 sail of ships, so that they are all named by some the Islands of Salt.

The other islands are more fertile, and produce rice, maize or Indian wheat, bananos, lemons, citrons, oranges, pomegranates, cocoa-nuts, figs, and melons; there is some wine, cotton, and sugar canes which they gather twice a year. The goats generally bring forth three or four kids at once, and that very often thrice a year. The chief merchandise is salt and goat's skins, of which are made the best cordevants, (cordovan leather, Maroquins as they are called by Captain Woodes Rogers.) They are called the Isles of Cape Verd, because they lie opposite to the Cape so called, being the western point of the island that lies in the mouth of the river Niger,* formed by the north and middle branches thereof, called Senegal and Gambia; when they were first discovered, viz. in 1440, by a Genevese, they were all desert, and so continued for thirty years, when they began to be inhabited by the Portuguese.

The island of Fuogo or of Fire has its name from a burning mountain that is in it; it is most terrible to see, in the night especially, what prodigious flames and vast clouds of smoke it vomits up continually, which we could perceive afterwards in a clear day, though we were above sixty miles distant from it."—Pinkerton, vol. xi.

*Fuego.*—The Ilha del Fuego or the Burning Island was so named, because in the north there is a volcano from which smoke and flame was issuing in 1572, when it was visited by Drake. This volcano was also in 1683 in a state of activity; for Dampier, who at that time visited these islands, especially the Isle of Salt, St Nicholas, states that it is one entire burning mountain, on the top whereof issues a fire, which may be discerned a great way off at sea in the night time. There is here the exaggeration usual among voyagers and travellers; for the island is not one entire burning mountain, and the southern part of it is said to be well inhabited, and capable of cultivation.

This island is fertile, and produces a great quantity of Indian corn beans, and all sorts of refreshments. Excellent cloths are made here for the trade of Guinea, and for the use of various inhabitants of the other islands. The climate, although warm, is healthy, on account of the rarefaction of the air caused by the volcano. There are several beaches for boats; but the only anchorage for vessels of burthen is on the west side of the island, in the bay called Luz. The Leven's anchorage was the north point of the island, N. 20°E.; extreme south point S. 68° E.; north flag-staff N. 85°E.; south flag-staff S. 21°E., in twenty-five fathoms soft sand, nearly abreast of the well, and off shore one quarter of a mile. The water is not good, and is also scarce, the well being down on the beach, which is a soft black sand, although the water comes from the rock. When there is a high sea or surf, it breaks over, as well as penetrates through the sand, and renders the water brackish. The inhabitants, as well as their cattle, have to descend a precipice of eighty feet in height, by a path cut in a zigzag direction in the rock to get to this well.

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* This is a common geographical error at that time, and down to a few years before Park's first journey. Many geographical speculators imagined that the Senegal and Gambia were outlets of the Niger; and Adanson, the French botanist, describes the Senegal as the Niger.

The Island of Salt is situate in 16° N. latitude, and in 19° 33 W. longitude from the Lizard Point. Its length from north to south is 9 leagues = 27 miles; and its breadth 2 leagues = 6 miles. It has abundance of salt ponds or lagoons, but no trees, and little grass.

West south west, 22 leagues from the Island of Salt, is St Nicholas, triangular in shape, the longest side to the east being 20 leagues in length, and the other two 22 leagues each. Near the shore it is rocky and barren; but further in are valleys which produce vines and grapes.

*St Nicholas* is high, having two remarkable mountains on it, which can be seen at the distance of fifteen leagues, one in the shape of a sugar-loaf, called the Peak of Trade, which is the middle of the island; the other on the west end of the island called Monte Gordo. The island is fertile, and refreshments can be procured at a low price; but water and wood are difficult to be obtained. There is a bay, which the natives call Carrical, known to the English by the name of Freshwater Bay, on the south side of the island, and about eight or nine miles from the east point. It is likewise, on some charts, termed Porto Preguica. This bay has a black sandy beach, over which, in a ravine, you will perceive a number of canes or green bushes. Vessels may anchor in ten fathoms, sheltered from the north-east winds. A few inhabitants reside here in small huts. The water is got by digging a well in the beach. There is also a pond behind the beach, from which you can fill; but in high tides the sea breaks over, and renders the water in the pond brackish.

Forty miles east by south from St Nicholas is the Island of Mayo, N. latitude 15° 10′, longitude 27° 5′ west from Greenwich, small, and with the coast full of shoals; but abounding in salt and cattle, and much frequented from May to August by turtles. It produces potatoes, plantains, and corn.

In 1792, when visited by Sir George Staunton, he represents the north-east end to be extremely low, little above the level of the sea, with a covering of white sand, not always easy discoverable in the night. The land rises gradually, however, till it arrives at a volcanic mountain. To the south west of this was irregular ground; and then followed an elevated irregular peak, much more lofty than the volcanic cone.

In October 1792 Sir George Staunton, in his voyage to China, visted the Cape Verd Islands. On the 1st of November 1792 they descried Bona Vista, in 16° 6′ north latitude, west longitude 22° 47′. The weather at this time was extremely sultry; and there was in the air an unhealthy humidity, which threw the body into a state of languor. The thermometer was between 82° and 84°. Variation 12° 36′ west of the pole. On the north-east of the island was a hill, which, from its conical and truncated shape, had the appearance of having been a volcano. Near the south-west end was another much higher with high land to the westward of it. The sea coast on the south-east side was beset with rocks; but towards the south-east end the shore was much covered with white sand.

*Brava.*—This island is very high, and could be seen at a great distance, were it not constantly covered by a dense atmosphere. The climate is however temperate, healthy, and fertile; and the island produces a large quantity of Indian corn, beans, and all sorts of refreshments, but little or no wood. The anchorages are four in number, but not one of them safe for vessels of burthen; only small vessels consequently frequent them for orchilla and grain.

"There are two small islands on the north-east side of Brava, called Rombo or Romes Islands, distant about five or six miles. These islands are nearly joined with other small rocks, some parts being above water, and forming a crescent. Between the westernmost island, which is lofty and having a peak on it, and the next rocks, is a passage of about half a mile wide, and having twenty-five fathoms water; and the easternmost island has a reef of rocks which extends nearly two miles partly under water, and in an E.N.E. direction. To the southward there is a clear passage between the above and the north end of Brava; the Leven at the west end of this channel had soundings eighty fathoms; the state of the weather did not allow her to pass entirely through, but, from observation, in a case of emergency any ship may take the passage, keeping about mid-channel.

*St Vincent.*—This island is mountainous and much exposed to winds. There are plenty of cattle, but very lean, in the dry season many dying for want of food. The island produces orchilla and some cotton; but there are no refreshments to be found at it, the inhabitants being mostly supplied with corn and fruit from St Antonio. There is an excellent bay called Porto Grande, one of the largest and safest in the Cape Verd Islands. Vessels can anchor at any depth from five to eighteen fathoms, perfectly sheltered from all winds; and plenty of good wood is to be got here; but the water that is obtained from a well on the north side of the bay is not good, especially in the dry season, and is also scarce. There is another bay on the south-west side, called St Pedro, which is of a middling size, with a fine sandy beach; and vessels can anchor here in ten fathoms, near the middle of the bay, or rather more to the westward. It is a good anchorage in the dry season, and the inhabitants say there is plenty of good water and wood. The American vessels employed in the whale-fishery frequent this bay.

"The rollers were setting high at the time I was there, which prevented me from examining it carefully. There is another anchorage on the east coast, called Do Pria da Gatta, with a sandy beach, near which vessels may anchor in six fathoms; the bottom is clear, but a sea sets directly in when the wind is either north-east or south-east, the island of St Lucie sheltering between these points. This bay and coast are without wood, water, or inhabitants.

*Report on the Mortality of Edinburgh, Leith, and Newhaven, for the months of January and February* 1846. By JAMES STARK, M. D., Fellow of the Royal College of Physicians of Edinburgh.—The Town Council of Edinburgh having at their last meeting in January had the subject of mortality tables for the city and suburbs brought before them by a letter from Mr Balleny, resolved to get such tables prepared, as the want of them had been much felt and complained of. Having paid much attention to this subject I offered to act gratuitously as registrar, provided they would consent to bear the necessary expenses. This having been agreed to, the managers of the different burying grounds were forthwith applied to for their consent to get extracts from the record books of their grounds; and the recorders were waited on to explain what was wanted from them, and in cases where all the necessary particulars were not entered in their registers to get such done in future. Much time was necessarily consumed in getting all matters satisfactorily arranged, but such having been done, I have much pleasure in laying before the medical profession the mortality returns of Edinburgh, Leith, and Newhaven, for January and February.

It is not a little strange that in the matter of mortality bills we have fallen greatly behind our predecessors of the last century. I have not had leisure to enquire at what period mortality bills for Edinburgh were first published, but they were in full operation in the year 1739, and in the

Scots Magazine monthly tables of the mortality of this city and suburbs were regularly published from that date down to the year 1794. The last table which appeared was for the month of May 1794, at which period they seem to have been brought to a sudden close.

No mortality tables for this city seem to have been published from that period till 1842, when Dr Watt, in drawing up a report on the mortality of the principal towns of Scotland, published the mortality returns of Edinburgh from 1836 to 1840. In so far as the annual number of deaths is concerned this great lacuna is supplied by the table which I published last year in the Edinburgh Medical and Surgical Journal, in my paper "on the probable cause of the prevalence and fatality of small-pox." In that table the annual mortality from all causes, and that from small-pox, compiled from the registers of the different burying-grounds, is given from 1780 to 1841 inclusive.

The mortality tables published during the last century were drawn up on the same principles, and adopted the same clasification of diseases as the London mortality bills before the passing of the late act for the registration of births, deaths, and marriages; and as the Scots Magazine published along with those of Edinburgh the mortality returns of London, Glasgow, Vienna, Paris, Amsterdam, the Hague, and kingdom of Prussia, a mass of statistical information was given, which may be consulted with advantage even at the present day.

In preparing mortality tables for Edinburgh and Leith the leading features of the plan now so successfully carried out in practice over England and Wales, under the registration act, have been adopted. This was done the more willingly, because it is only by employing a similar classification of diseases that our tables can be rendered available for comparison with theirs; and because this classification of diseases must be adopted whenever the registration act shall be extended to Scotland—the only country of Europe in which tables of the births, deaths, and marriages of its population are not published.

In order to procure as correct returns as possible every medical practitioner in Edinburgh and Leith has been furnished with a book of forms of medical certificate of the cause of death. In my circular to these gentlemen they are requested to fill up the several particulars therein mentioned, and leave the certificate with the relations or inmates of the house in which the death has occurred, with directions that it be transmitted to the recorder of the burying ground in which the body is to be interred. The recorders copy the several particulars in the schedule headed "Return of Interments in the———Burying-Ground" and transmit the same to me weekly or monthly, when the whole deaths are classified according to the diseases and ages.

It is necessary to mention that the numbers in the following tables are the absolute amount of deaths which have happened in Edinburgh and Leith for the months of January and February. This is insured by having the returns made of every interment in every burying ground in and around Edinburgh and Leith. The medical certificates are chiefly of use in procuring correct returns of the *names* of the diseases, but are not essential to the working of the plan.

Arrangements have been made by which abstracts of the mortality tables will be published monthly, or weekly should occasion require, in the Edinburgh newspapers and other periodicals, and along with it the state of the barometer, thermometer, and rain gauge, extracted from the register kept by Mr Adie, the celebrated optician.

As it appears to be an error in the English tables to class premature births under the head of debility, where those who have been born *alive* are classed with those who have never breathed, they have been placed by themselves in the Edinburgh tables. The whole deaths are thus classed under thirteen heads. 1. Epidemic, endemic, or contagious diseases; 2. Diseases of uncertain seat; 3. Diseases of brain and nervous system; 4. Diseases of respiratory organs; 5. Diseases of heart and blood-vessels; 6. Diseases of stomach, liver, and organs of digestion; 7. Diseases of kidneys; 8. Childbirth and diseases of uterus, &c.; 9. Rheumatism and diseases of bones and joints; 10. Diseases of skin and cellular tissue; 11. Old age; 12. Violence, privation, cold, and intemperance; 13. Still-born.

The following is an abstract of the mortality tables of Edinburgh and Leith for the months of January and February of the current year:—

## EDINBURGH.

January 1846.

Males, . 198 } Total, 409.
Females, . 211 }

The mortality this month exhibits an increase of 55 above that of January 1845.

February 1846.

Males, . 180 } Total, 354.
Females, . 174 }

The mortality this month shows an increase of 2 above that of February 1845.

| Ages. | Jan. No. | Feb. No. |
|---|---|---|
| Still-born, . . | 27 | 27 |
| 1 year and under, | 82 | 67 |
| 2 years, . . | 41 | 31 |
| 5, . . . . | 26 | 29 |
| 10, . . . . | 13 | 8 |
| 15, . . . . | 5 | 1 |
| 20, . . . . | 11 | 14 |
| 30, . . . . | 34 | 26 |
| 40, . . . . | 35 | 27 |
| 50, . . . . | 32 | 22 |
| 60, . . . . | 24 | 24 |
| 70, . . . . | 32 | 34 |
| 80, . . . . | 27 | 24 |
| 90, . . . . | 13 | 7 |
| 100, . | 1 | 5 |
| 102, . . . . | 0 | 1 |
| Not stated, . . | 6 | 7 |
| Total, | 409 | 354 |

Classified Table of Diseases.

| Class. | Diseases. | Jan. No. | Feb. No. |
|---|---|---|---|
| I. | Small-pox, (not vaccinated,) | 4 | 7 |
| | Measles, . | 40 | 25 |
| | Scarlet fever, | 2 | 2 |
| | Hooping cough | 5 | 15 |
| | Croup, . | 4 | 10 |
| | Thrush, . | 6 | 5 |
| | Diarrhœa, . | 10 | 7 |
| | Dysentery, | 0 | 1 |
| | Remittent fever, | 2 | 2 |
| | Typhus fever, | 25 | 12 |
| | Influenza, | 1 | 0 |
| | Erysipelas, . | 6 | 1 |
| | Syphilis, . | 2 | 0 |
| II. | Hæmorrhage | 1 | 3 |
| | Dropsy, . | 3 | 14 |
| | Abscess, . | 1 | 0 |
| | Mortification, | 1 | 1 |
| | Scrofula, . | 0 | 1 |
| | Cancer, . | 3 | 2 |
| | Tumour, . | 0 | 1 |
| | Debility, . | 16 | 9 |
| | Sudden deaths, | 0 | 1 |
| III. | Cephalitis, . | 0 | 1 |
| | Hydrocephalus, | 16 | 7 |
| | Apoplexy, . | 9 | 10 |
| | Paralysis, . | 5 | 2 |
| | Convulsions, | 0 | 1 |
| | Epilepsy, . . | 0 | 1 |
| | Insanity, . | 2 | 1 |
| | Delirium tremens, | 1 | 1 |
| IV. | Bronchitis, . | 1 | 3 |
| | Pleurisy, . | 1 | 1 |
| | Pneumonia, . | 23 | 13 |
| | Laryngitis, . | 0 | 1 |
| | Hydrothorax, | 3 | 4 |
| | Asthma, . | 1 | 6 |
| | Consumption, | 51 | 42 |
| | Lung disease, | 0 | 1 |
| V. | Heart disease, | 13 | 5 |
| VI. | Teething, . | 10 | 6 |
| | Enteritis, . | 3 | 3 |
| | Peritonitis, | 2 | 1 |
| | Tabes mesenterica, | 9 | 8 |
| | Worms, . | 2 | 0 |
| | Ulcer of intestines, | 1 | 1 |

| Class. | Diseases. | Jan. No. | Feb. No. |
|---|---|---|---|
| | Colic or ileus, | 1 | 1 |
| | Stomach disease, | 0 | 2 |
| | Jaundice, . | 0 | 1 |
| | Liver disease, | 2 | 3 |
| VII. | Diabetes, . | 1 | 0 |
| | Kidney disease, | 1 | 0 |
| VIII. | Child-birth, . | 3 | 2 |
| | Paramenia, . | 0 | 1 |
| IX. | Rheumatism, | 0 | 1 |
| | Joint and spine disease, . | 0 | 2 |
| X. | Old age, . | 44 | 36 |
| XI. | Privation, . | 1 | 0 |
| | Violent deaths, | 7 | 5 |
| XII. | Still-born, . | 27 | 27 |
| | Cause not stated, | 37 | 35 |
| | Total, | 409 | 354 |

Remarks.—*January*. It will be seen from the above tables that during the month of January measles, hooping cough, croup, and small-pox were the epidemic, endemic, or contagious diseases prevalent among children. Measles was in especial very fatal during the month, no fewer than 40 cases of death having occurred, 20 males and 20 females; of these only five were above five years of age, one male and four females. As croup is commonly reckoned one of the endemic diseases, it may be stated that the places where the deaths occurred were Bonnington Road, Cowgate, Blackfriars' Wynd, and Jamaica Street. The fact of none of the fatal cases of small-pox having been vaccinated is quite in conformity with the opinion which I expressed in my paper, "on the probable cause of the prevalence and fatality of small-pox, published in this Journal in July of last year." The cases of remittent fever were confined to Stockbridge—a locality in which croup and remittent fever are far from uncommon, probably produced by its low-lying damp situation, and its vicinity to the stagnant pools of the Water of Leith.

Among adults, typhus fever and erysipelas were the most prevalent and fatal of the zymotic diseases. Neither of these were confined to the lower classes, several individuals of the upper ranks having fallen victims to their severity. Of the 25 typhus fever cases 13 were males and 12 females; the fatal period of life from that disease being from the 20th to the 60th year.

Of the six cases of erysipelas four were males and two females.

The cases of cancer were all in widows, respectively aged 56, 67, and 71.

Pneumonia and consumption were the two most fatal diseases of the respiratory organs, during January, 10 males and 13 females having died of pneumonia; 21 males and 30 females having died of consumption. The mode in which females expose the chest may serve somewhat to account for the greater mortality among them from diseases of the lungs, without attributing it to any other cause.

The most remarkable fact which the table for January seems to establish, is that consumption and other diseases of the respiratory organs are much less common in Edinburgh than in London, or even over the whole of England and Wales. Thus in London, during the month of January of the present year, diseases of the respiratory organs, including hooping-cough and croup, exceeded a third of the mortality; and over England and Wales they amount to a third of the deaths. The average of London for the last five years gives a proportion of 349 for these diseases out of every 1000 deaths. In Edinburgh, however, during the month of January, the deaths from diseases of the respiratory organs, including hooping-cough and croup, were only between a fourth and a fifth of the total mortality, or in the proportion of 215 out of every 1000 deaths.

The enormous proportion of still-births must strike every one as something remarkable. In the English tables these are included under the head of Debility. Under the same head in these tables are only placed those who are born alive but die within a few hours, days, weeks, or months, from debility or feebleness of organization. In London then, such cases amount on an average of five years to only 22 per 1000 deaths; but in Edinburgh the still-births and cases of debility amount to the enormous proportion of 100 in every 1000 deaths. The still-births of January this year exceeded by two those of January 1845. The large proportion of males in the still-born has been long noticed; during this month 21 were males and only six females; but of the cases of debility nine were males and seven females.

The violent deaths during January were, 1. a carter, 63 years, suicide by drowning; 2. a soldier, 21 years, killed by a fall from the castle rocks, in endeavouring to escape from the castle; 3. a boy, aged 7, killed on Leith Walk by wheel of cart going over him; 4. a tailor, aged 26, suicide, by what means not stated; 5. a girl, 8½ years, by accident, particulars not given; 6. a shoemaker, 61 years, bled to death from an accidental cut with his knife while at work; 7. a female, 47 years, accident, cause not stated.

The case of privation was a clerk, 61 years, who died from want of food.

*February.*—The zymotic diseases prevalent among children during the month of February, were measles, hooping cough, croup, and small-pox. Measles was greatly on the decline, only 25 cases having proved fatal, 10 being males and 15 females. Hooping cough, croup, and small-pox, were, however, greatly on the increase. The cases of small-pox were all among the non-vaccinated, a fact proving but too clearly the reasons why this disease still prevails among the lower classes. Were all efficiently vaccinated it cannot be doubted that small-pox would be almost quite extirpated from among us.

Of the cases of croup five were males and five females. Almost all the cases have occurred in low-lying, confined, or damp situations, yet not so strikingly so as to lead to the conclusion that this disease solely originated from endemic causes. A few cases of croup which I myself attended during the month, but which recovered, were produced by exposure of the child to cold when it was under the irritation of teething. The places where the cases of croup proved fatal were Allison Square, Simon Square, Blair Street, Anchor Close, South Gray's Close, Calton Street, Grassmarket, Causewayside, William Street, and Hillhousefield.

Stockbridge and the neighbourhood of the canal furnished the cases of intermittent fever.

Among adults typhus fever and erysipelas have been on the decline, but the former still numbered among its victims one or two from the higher classes.

During this month 7 males and 6 females died from pneumonia; 19 males and 23 females from consumption. Diseases of the respiratory organs, including the cases of hooping cough and croup, were somewhat more than a fourth, but much less than a third of the mortality—being in the proportion of 271 out of every 1000 deaths.

The still-births maintained their high proportion this month, the actual number being exactly the same as in the month of January, the males being also as in it 21, and the females 6. The still births during this month exceeded by 3 those of the corresponding month of the previous year.

The violent deaths during February were, 1. A cabinetmaker, 31 years, killed by accidental fall while at work. 2. A seaman, 31 years, killed by fall into the sea from yard of mast. 3. A groom, 40 years, suicide by cutting his throat. 4. A carver, 17 years, killed by fall from waggon. 5. A cowfeeder, 69 years, accidental fall; particulars not stated.

## LEITH AND NEWHAVEN.

| January 1846. | | | February 1846. | | |
|---|---|---|---|---|---|
| Males, . | 38 | Total 72. | Males, . | 25 | Total 49. |
| Females, . | 34 | | Females, . | 24 | |
| Being an increase of 5 above that of January 1845. | | | Being an increase of 12 above that of February of the preceding year. | | |

| Ages. | Jan. No. | Feb. No. | Ages. | Jan. No. | Feb. No. |
|---|---|---|---|---|---|
| Still born, | 10 | 3 | 40 years, | 7 | 1 |
| 1 year and under, | 8 | 9 | 50, | 5 | 5 |
| 2 years, | 3 | 3 | 60, | 5 | 10 |
| 5, | 0 | 1 | 70, | 12 | 3 |
| 10, | 5 | 0 | 80, | 5 | 7 |
| 15, | 0 | 1 | 90, | 2 | 3 |
| 20, | 4 | 2 | | — | — |
| 30, | 6 | 1 | Total, | 72 | 49 |

Classified Table of Diseases.

| | Diseases. | Jan. No. | Feb. No. | | Diseases. | Jan. No. | Feb. No. |
|---|---|---|---|---|---|---|---|
| I. | Hooping-cough, | 1 | 4 | IV. | Respiratory organs, | 8 | 9 |
| | Croup, | 0 | 1 | V. | Heart disease, | 1 | 3 |
| | Diarrhœa, | 2 | 0 | VI. | Organs of digestion, | 3 | 1 |
| | Typhus fever, | 4 | 1 | VIII. | Child-birth, | 3 | 0 |
| | Erysipelas, | 0 | 1 | IX. | Disease of joints, | 1 | 0 |
| II. | Dropsy, | 4 | 2 | XI. | Old age, | 8 | 8 |
| | Abscess, | 1 | 1 | XII. | Intemperance, | 1 | 0 |
| | Mortification, | 2 | 0 | | Violent deaths, | 1 | 4 |
| | Scrofula, | 1 | 0 | XIII. | Still-born, | 10 | 3 |
| | Cancer, | 1 | 1 | | Cause not ascertain. | 5 | 6 |
| | Debility, | 2 | 1 | | | — | — |
| | Sudden deaths, | 3 | 1 | | Total, | 72 | 49 |
| III. | Brain disease, | 10 | 2 | | | — | — |

*Remarks.*—Four of the cases whose cause was not specified in January were believed to be cases of fever making the very large proportion of eight out of 72 cases. The diseases of the respiratory organs, including hooping-cough, amounted during January to an exact ninth of the total mortality, and to less than a fifth during February, proportions very inferior to that of London or England for the same classes of disease. It is not a little strange that two of three cases of death from childbirth occurred in the fisherwomen of Newhaven, a class formerly believed to be peculiarly exempt from the ordinary dangers attending childbirth. The number of still-births is quite enormous when considered with reference to the total mortality. During January, the still-births, including the cases of debility, amounted to an exact sixth of the mortality, or were in the proportion of 165 out of every 1000 deaths. During February, the proportion fell below that of Edinburgh for the same period, being only a twelfth of the total mortality, or in the preportion of 80 out of every 1000 deaths. One circumstance relative to the still-births is too remarkable to be passed over in silence, and that is the exceeding liability to miscarriage among the wives of soldiers. As an instance of this it may be mentioned that in one burying-ground no less than an *exact third* of the interments during last year were still-born fœtuses, and all were furnished by the horse regiments at Piershill Barracks.

The violent death for the month of January was a girl, 8 years, whose spinal column was fractured by a fall down a cellar. The death from intemperance was a spirit dealer, 39 years, who died from the effects of a fall when intoxicated.

During February the violent deaths were, 1. a carter, 13 years, killed by accident; particulars not given. 2. A labourer, 45 years, died from effects of bruise. 3. A female, 57 years, leg broken by an accident, particulars of accident not given, and otherwise injured. 4. A porter, 56 years, died from effects of amputation of leg.

21 *Heriot Row.*

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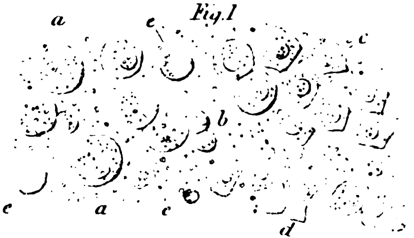

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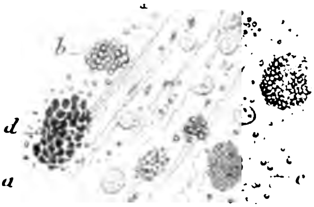

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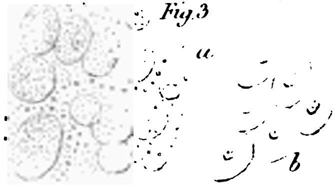

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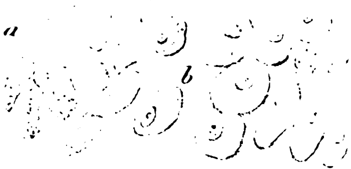

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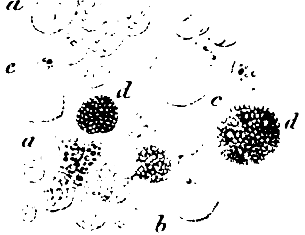

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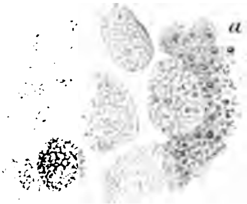

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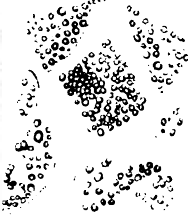

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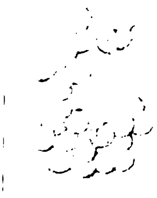

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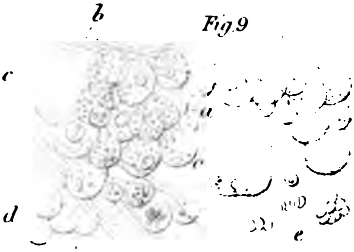

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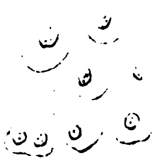

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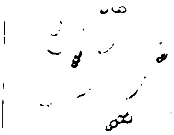

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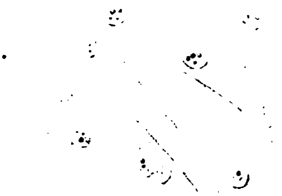

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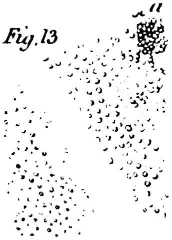

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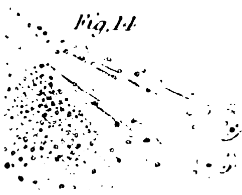

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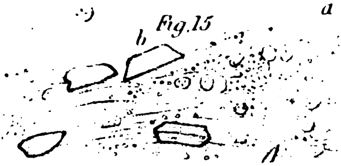

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